United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-01-F-0048

February 14, 2001

Memorandum

To: Regional Director, Mid-Pacific Region, Bureau of Reclamation, Sacramento, California

From: Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Formal Consultation on the Central Valley Project (CVP) Water Contract Renewals for the Hidden and Buchanan Units contractors

This memorandum transmits the Fish and Wildlife Service (Service) biological opinion on the Service's review of proposed water service contract renewals for CVP Hidden and Buchanan Unit contractors. This opinion is provided in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.). Based upon our review of the project including the conservation measures, I have concluded that Reclamation's action to renew the water service contracts is not likely to jeopardize the continued existence of the species considered in this opinion.

for Cay C. Goude

Attachment

cc: ARD (ES) Portland, Oregon

Biological Opinion
On U.S. Bureau of Reclamation
Long Term Contract Renewal of
Buchanan and Hidden CVP Contracts

February 14, 2001
File Number 1-1-01-F-0048

U. S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Endangered Species Division
2800 Cottage Way, W-2605
Sacramento, California 95825-1846

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Introduction

Purpose of Consultation

This biological opinion has been prepared by the U.S. Fish and Wildlife Service (Service) to address the proposed renewal, by the U.S. Bureau of Reclamation (Reclamation), of the Buchanan and Hidden Unit water service contracts of the Central Valley Project (CVP) in accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA). These renewals will be consistent with Reclamation law including, but not limited to, section 3404(c) of the Central Valley Project Improvement Act (CVPIA), and will be for the 25 year period from March 2001 through February 2026. Water identified in these contracts will be placed to beneficial use within the Friant Division authorized place of use for agricultural purposes. Other relevant consultations include the Friant biological opinion of 1991 (Friant opinion), the biological opinion on the Operational Criteria and Plan for the CVP, March 6, 1995, and Interim Contract Renewal biological opinions (Interim opinions) completed in 1995, 1998, and 2000.

Opinion Summary and Conclusion

The description of the Proposed Action (starting on page 2-1) was developed collaboratively by Reclamation, representatives from the Friant Division, including service areas of the Buchanan and Hidden Unit CVP water contracts, and the Service and includes negotiated contract language and appropriate conservation commitments. The commitments and the *conservation measures* specified in section 2 of this document have been developed by Reclamation and the Service to conserve listed species and address impacts resulting from past and continuing actions related to renewal of these contracts, Section 7(a)(1) activities, and other authorities.

The Final Environmental Assessments (EA) and other National Environmental Policy Act (NEPA) documentation, the Biological Assessments (BA) prepared for the Friant Division and Cross Valley Unit contract renewals, and information received in the memo, dated February 1, 2001, requesting initiation of ESA consultation for the Buchanan and Hidden Unit CVP contract renewals were also considered in this determination. To better assist Reclamation and the Service in planning and project implementation, the Service's SFWO Endangered Species Division provided guidance on implementation of the ESA which is an integral part of this opinion. The ESA guidance in this opinion is intended to be followed based on the effects to listed species. Any ancillary or exclusionary language from laws other than ESA should not be used to bear upon any effects determinations that are made relative to listed species.

Contract Items to be Handled Under Separate ESA Determinations

To reach a no jeopardy conclusion for this opinion the following actions, included in the long-term renewal contracts, are not covered by this opinion. These actions, as listed below, and any other action not described in the Project Description of this biological opinion, will require

separate determinations regarding their potential effects on threatened and endangered species and critical habitat pursuant to section 7 and/or section 10 of the ESA.

- Any future assignments involving Buchanan and Hidden Unit CVP contract water
- Transfers and/or exchanges involving Buchanan and Hidden Unit CVP contract water
- Inclusions and exclusions to Buchanan and Hidden CVP Unit contractor service area boundaries
- Warren Act contracts
- Surplus Flood Flow Water Contracts
- Future changes in purpose of use from Ag only to Ag/M&I involving Buchanan and Hidden Unit CVP contractors
- Any changes in purpose of use
- Operation and Maintenance on Federal and District lands used to convey CVP water and implementation of the agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).
- Operation and Maintenance Plans
- Actions associated with the San Joaquin River Restoration Program
- New contracts
- Future contract renewals beyond the year 2026

Species Included in Consultation

This biological opinion covers 22 federally listed species, one proposed species, and three candidate species. Scientific names and the associated protection status of these species are listed in Table 1.1. With the exception of the following, all species were included in the 1991 Friant opinion or subsequent Interim opinions or amendments: California red-legged frog, California tiger salamander, mountain yellow-legged frog, and Yosemite toad. These additions reflect new proposals, listings, critical habitat designations, and recent research findings. Critical habitat for the California red legged frog was proposed for listing in 2000. The California tiger salamander was recently determined to be warranted for listing. The mountain yellow-legged frog and the Yosemite toad are species found in the Sierra Nevada foothills, outside of the CVP's service areas. However, a recent study conducted by the U.S. Geological Survey and U.S. Department of Agriculture indicates that pesticide use in the San Joaquin Valley may be affecting populations of breeding amphibians in the Sierra Nevada mountain ranges due to prevailing summer winds.

Table 1.1 Species considered in this biological opinion, including common name, scientific name, Federal status and whether the species has critical habitat.

Note: Species in bold indicate new species not considered in Friant and Interim opinions and the amendment to the 1995 Interim opinion.

Common Name	Scientific Name	Federal Status	Critical Habitat
Aleutian Canada goose	*Branta canadensis leucopareia*	Threatened	
Bald eagle	*Haliaeetus leucocephalus*	Threatened	
Blunt-nosed leopard lizard	*Gambelia silus*	Endangered	
California red-legged frog	***Rana aurora draytonii***	**Threatened**	**Proposed**
California tiger salamander	***Ambystoma californiense***	**Candidate**	
Colusa grass	*Neostapfia colusana*	Threatened	
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	
Delta smelt	*Hypomesus transpacificus*	Threatened	Yes
Fleshy owl's-clover	*Castilleja campestris ssp. succulenta*	Threatened	
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	Endangered	Yes
Giant garter snake	*Thamnophis gigas*	Threatened	
Greene's tuctoria	*Tuctoria greenei*	Endangered	
Hairy Orcutt grass	*Orcuttia pilosa*	Endangered	
Hartweg's golden sunburst	*Psedobahia bahiifolia*	Endangered	
Mountain plover	***Charadrius montanus***	**Threatened**	
Mountain yellow-legged frog	***Rana muscosa***	**Candidate**	
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	Endangered	
Riparian brush rabbit	***Sylvilagus bachmani riparius***	**Endangered**	
Riparian woodrat	***Neotoma fuscipes riparia***	**Endangered**	
Sacramento splittail	*Pogonichthys macrolepidotus*	Threatened	
San Joaquin kit fox	*Vulpes macrotis mutica*	Endangered	
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	Threatened	
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	Yes
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	
Yosemite toad	***Bufo canorus***	**Candidate**	

Consultation Information

The direct, indirect, and interrelated and interdependent effects of the action, and cumulative effects, are added to the environmental baseline that is evaluated together with the current status of the species or critical habitat to ascertain the likelihood of a given action jeopardizing the continued existence of the listed species or adversely modifying or destroying critical habitat under consideration. The environmental baseline includes past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of Federal actions that have undergone formal or early Section 7 consultation, and the impact of State and private activities that are contemporaneous with the consultation process. In examining the current status of a listed species, the Service considers the species needs, including its breeding, feeding, and sheltering requirements. Historical information is used where available to provide a perspective on geographic distribution and population levels and to project future trends. Recovery plans and goals are utilized to the extent that they are current and represent the best available scientific information.

This biological opinion is consistent with the tiered implementation of the CVPIA, as described in the Programmatic Environmental Impact Statement for the CVPIA (PEIS) and the programmatic biological opinion on *Implementation of the CVPIA and Continued Operation and Maintenance of the CVP*, issued November 2000. The PEIS is a tiered NEPA document that allows for future site-specific NEPA analysis on CVPIA actions, including, as with this Proposed Action, the long-term renewal of CVP water service contracts (section 3404(c)).

Conclusion

The Service has concluded that the proposed action, as described in this opinion, is not likely to jeopardize the following species: Aleutian Canada goose, bald eagle, blunt-nosed leopard lizard, California red-legged frog, California tiger salamander, Colusa grass, Conservancy fairy shrimp, Delta smelt, fleshy owl's-clover, Fresno kangaroo rat, giant garter snake, Greene's tuctoria, hairy Orcutt grass, Hartweg's golden sunburst, mountain plover, palmate-bracted bird's-beak, Sacramento splittail, San Joaquin kit fox, San Joaquin Valley Orcutt grass, valley elderberry longhorn beetle, vernal pool fairy shrimp, and vernal pool tadpole shrimp. The Service has concluded that the proposed action, described in this opinion, is not likely to adversely affect the bald eagle.

It was also concluded that, because of their close proximity, historic range and inclusion in future consultation actions, the riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*) should continue to be a focus of conservation efforts for this Proposed Action, if conservation efforts in this Project Description are determined to be expandable to encompass the needs of these species. The historic range of the riparian brush rabbit was within riparian forests along portions of the San Joaquin River and its tributaries on the Valley floor (Service 1998). The riparian woodrat was historically believed to occur along the river bottom lands as far as southern Merced County or northern Fresno County (Service 1998). Neither the riparian brush rabbit nor riparian woodrat currently are found within the Buchanan and Hidden Unit areas. The SJV Recovery Plan for Upland Species identifies efforts to restore and link riparian habitat, and reintroduce populations of riparian woodrats and brush rabbits as conservation actions needed to recover these species. Effects to these species is

germane to the Friant Division CVP contract service area which includes the Buchanan and Hidden Unit CVP contractors, the Chowchilla Water District (WD) and Madera Irrigation District (ID), and will be analyzed in future tiered consultations relevant to the Friant Division, including but not limited to Surplus Flood Flows Contracts and Implementation of the San Joaquin River Riparian Restoration Program.

This conclusion is based on the assumption that measures in this biological opinion are fully implemented. Actions that are not consistent with the Project Description in this document have not been analyzed for their impacts on the survival and recovery of proposed and listed species.

Study Area Description

The study area associated with the Buchanan and Hidden Unit CVP water contracts is summarized below. For a more detailed description, refer to the associated draft EA and BA for the Friant Division long-term contract renewal.

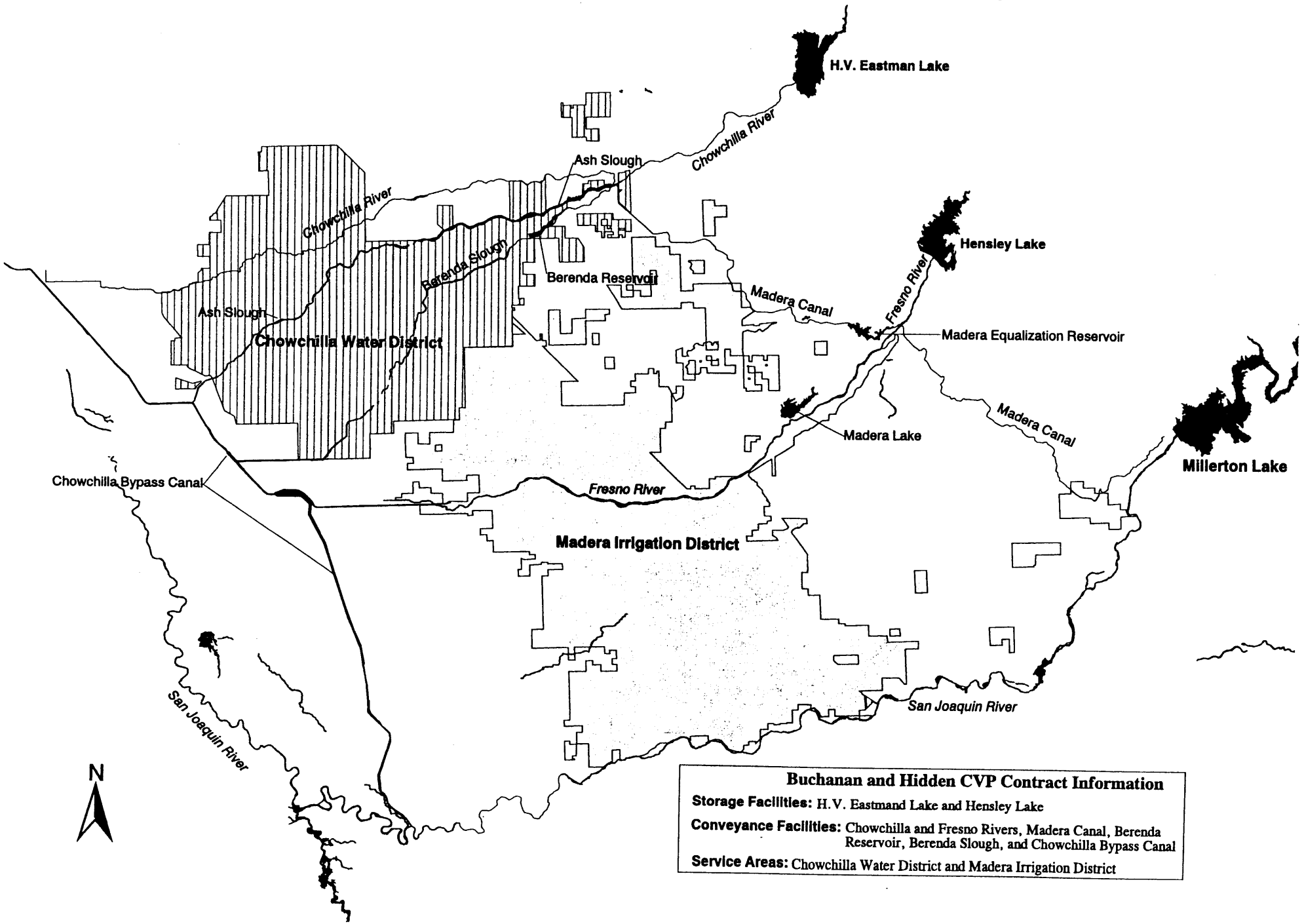
Storage and Conveyance

Although not part of the Friant Division, Buchanan and Hidden Unit CVP water contracts provide CVP project water to Friant Division contractors through H. V. Eastman Lake and Hensley Lake (Figure 1.1). Eastman and Hensley Lakes are operated by the Army Corp of Engineers (COE). H. V. Eastman Lake is located on the Chowchilla River about 15 miles northeast of the City of Chowchilla. Operation facilities associated with the Buchanan Unit include Buchanan Dam, dikes and an extensive channel system. With a capacity of 150,600 acre-feet, a maximum of 45,000 acre-feet is allocated during flood season for flood storage. Buchanan Dam is operated to fill and empty Eastman Lake each year. From Buchanan Dam, water flows to the 30 mile-long Chowchilla Bypass Canal via Ash Slough, the main tributary of the Chowchilla River, thus providing CVP water to Chowchilla WD.

Hensley Lake is located on the Fresno River about 15 miles northeast of the City of Madera. Operation facilities associated with the Hidden Unit are Hidden Dam, dikes and an extensive channel system. With a capacity of 82,500 acre-feet, a maximum of 65,000 acre-feet is allocated during flood seasons for flood control storage. The Fresno River flows from Hensley Lake to the 13.3 mile-long Madera Canal and provides CVP water to Madera ID.

The Madera Canal, which conveys water northwest from Friant Dam, crosses the Fresno River approximately 3 miles downstream from Hensley Dam. A portion of the water supply to the Madera Canal service area is supplied through the integrated operation of Hidden Dam on the Fresno River and Buchanan Dam on the Chowchilla River, which are included in the Eastside Division of the CVP. Deliveries from Madera Canal to CVP contractors can be made via the Fresno River, as are flood spills during flood control operations. The Madera Canal extends north from Friant Dam to Ash Slough on the Chowchilla River in Madera County. The Canal diverts water to supply lands in Madera ID and Chowchilla WD, within the Friant Division area, with a supplemental irrigation supply.

Figure 1.1
Buchanan and Hidden CVP Water Contract Area



Supply and Delivery
Eastman and Hensley lakes are filled completely by rainfall (not snow feed), and CVP deliveries are determined by the timing and amount of annual rainfall and the available storage. The Buchanan and Hidden Unit CVP water contracts provide for the delivery of CVP water to Madera ID and Chowchilla WD in the Friant Division, varying from 0 to almost 90,000 acre-feet.

Definitions of Terms

Numerous terms and acronyms are used for actions and projects within the CVP and CVPIA. In this document use of acronyms has been limited to those entities, acts, and descriptors that are referred to frequently. A list of these acronyms is provided below.

CVP..... Central Valley Project
CVPIA..... Central Valley Project Improvement Act
DFG..... California Department of Fish and Game
DWR..... California Department of Water Resources
ESA..... Endangered Species Act
HCP..... Habitat Conservation Plan
M&I..... Municipal and Industrial
NEPA..... National Environmental Policy Act
NMFS..... National Marine Fisheries Service
O&M..... Operation and Maintenance
PEIS..... Programmatic Environmental Impact Statement for the CVPIA
SWRCB..... State Water Resources Control Board

The following definitions of terms will provide clarity for the reader.

Authorized Place of Use - An area established by Reclamation's water rights permits which are issued by the California State Water Resources Control Board within which the CVP water can be used.

District Boundary - legally recognized area where the District does business. The boundary is filed with and maintained by the California Secretary of State.

District Service Area - (as defined by the Bureau of Reclamation) - area to which a water district can deliver CVP water. It is an area equal to or less than the district's legal boundary. The reduction would account for those areas that are inside the district's boundaries but outside the authorized place of use and not entitled to CVP water utilization.

Consultation History - Related Consultations

Consultation for the Buchanan and Hidden Unit CVP water contract renewals was initiated by Reclamation on February 2, 2001. Because expedient completion of this consultation remains vital to agreements associated with restoration of the San Joaquin River, the Service has agreed to attempt to complete consultation by February 14, 2001.

Because the Buchanan and Hidden Unit CVP water contracts deliver water to the Friant Division, their water contract renewal consultation history is tied with that of the Friant Division and is therefore equally extensive. Consultation for the Friant Division includes the 2001 Friant Division and Cross Valley Unit Long-term Contract Renewal biological opinion (Service file #1-1-01-F0027), 1991 Friant long-term water contract renewal consultation, three interim water contract consultations covering the Friant Division (1995, 1998, 2000), and consultations on other large-scale projects and plans that impact species protected under the ESA. The biological opinions resulting from these consultations stand on their own merits, have established thresholds to ensure survival and recovery of listed species, and have established, or work towards establishing, a baseline for the effects considered by the consultations. Of particular note are: the Service's October 15, 1991, biological opinion on the Friant Water Contract Renewals (Friant, Service file #1-1-91-F-22); the Service's opinions on the Los Vaqueros Project--in particular the September 9, 1993, opinion (Los Vaqueros, Service file #1-1-93-F-35) and the April 27, 2000, opinion on the Los Vaqueros Pipeline (Los Vaqueros Pipeline, Service file #1-1-99-F-93); the Service's December 27, 1994, biological opinion on Interim Water Contract Renewal (Interim, Service file #1-1-94-F-69); the Service's March 6, 1995, biological opinion on Reclamations's Long-term Operations Criteria and Plan (OCAP, Service file #1-1-94-F-70); and the programmatic consultation on Implementation of the CVPIA and Continued Operation and Maintenance of the CVP (CVPIA, #1-1-98-F-0124).

To assist in support and understanding of this opinion, we have provided the following time line of recent Service biological opinions, germane to this opinion. Records of these consultations are on file at the Service's Sacramento Fish and Wildlife Office (SFWO). (Note: Service file number in parenthesis and addressed species identified in each).

October 15, 1991—Friant Water Contract Renewals (1-1-91-F-22), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species (amended May 14, 1992, appended to 1-1-95-F-39 on February 27, 1998)

February 12, 1993—Long-Term Operations Criteria and Plan for CVP Reservoirs (1-1-93-F-10), bald eagle, salt marsh harvest mouse, California clapper rail.

May 23, 1993—Operations Criteria and Plan (1-1-92-F-18), bald eagle, salt marsh harvest mouse, California clapper rail.

May 26, 1993—1993 Operations Criteria and Plan-Delta smelt (1-1-93-F-32) delta smelt.

September 2, 1993—Los Vaqueros vernal pool shrimp conference opinion (1-1-93-C-68), vernal pool fairy shrimp, longhorn fairy shrimp, California linderiella.

September 9, 1993—Los Vaqueros Project (1-1-93-F-35), delta smelt.

February 4, 1994—1994 Operations Criteria and Plan (1-1-94-F-2), delta smelt.

December 27, 1994—Interim Water Contract Renewal (1-1-94-F-69), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.

February 23, 1995—Amendment of December 27, 1994, Interim Water Contract Renewal opinion to include critical needs planning (1-1-95-F-39).

March 6, 1995—Long-term Operations Criteria and Plan (1-1-94-F-70) delta smelt, delta smelt critical habitat, Sacramento splittail [amended April 26, 1995 (1-1-95-I-804)].

August 14, 1996—Interim Operation of Kern Water Bank (1-1-95-F-63), San Joaquin kit fox and many others. [Action converted to a Habitat Conservation Plan (1-1-97-F-108)].

April 26, 1996—Temporary Barriers (1-1-96-F-53), delta smelt and delta smelt critical habitat.

January 20, 1998—Interim Water Contract Renewal Opinion amendment (1-1-98-I-383), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.

February 27, 1998—Reinitiation of Formal Endangered Species Consultation on the Supplemental Interim Renewal of Central Valley Project Water Contracts to include 14 Friant Water Contracts (1-1-98-I-595), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species.

March 19, 1998—Refuge Water Supply Program (1-1-98-F-61) giant garter snake.

May 4, 1998—Draft Jeopardy on Interim South Delta Project (1-1-97-F-184), delta smelt and delta smelt critical habitat.

December 7, 1998—Conveyance of Refuge Water Supply East and West Sacramento Valley (1-1-99-F-15) giant garter snake.

March 11, 1999—Water Service Contracts with Sacramento County Water Agency, San Juan Water District, and City of Folsom (1-1-97-F-161), several species.

March 19, 1999—Solano Project Contract Renewal (1-1-99-F-54), several species.

April 27, 1999 — Los Vaqueros Pipeline, Contra Costa County (1-1-99-F-039), several species.

June 28, 1999—Refuge Water Conveyance Mendota Wildlife Management Area, Kern and Pixley National Wildlife Refuges (1-1-99-F-36) several species.

September 21, 1999—CVPIA Land Retirement Program Demonstration Project, Fresno, Kings and Tulare Counties (1-1-99-F-125) several species.

February 29, 2000—Interim Biological Opinion (1-1-00-F-0056) several species.

March 24, 2000—California Toxics Rule (1-1-98-F-21) several species.

November 21, 2000—Implementation of the CVPIA and Continued Operation and Maintenance of the CVP, Programmatic Consultation (#1-1-98-F-0124).

January 19,2001—Long Term Contract Renewal of Friant Division and Cross Valley Unit Contracts (1-1-01-F-0027) several species.

1991 Friant Biological Opinion

The Friant opinion of 1991 (Friant opinion) (Service File No. 1-1-91-F-22) covered 28 CVP contracts in the Friant Division that were to be renewed prior to 2028. Since 1991, 26 of the 28 contracts of the Friant Division have been renewed for a number of Interim periods. The Service determined that Reclamation's proposed action likely would not jeopardize the continued existence of 14 affected listed species inhabiting the Friant service area and San Joaquin Valley or adversely modify or destroy any designated critical habitat. In addition, the Service concluded that although the least Bell's vireo's continued existence likely would not be jeopardized, proposed contract renewal could adversely affect this species recovery. The Service also determined in its preliminary review of the action that affected species outside the San Joaquin Valley likely would not be jeopardized by Friant contract renewal. The Service based its conclusion on implementation of mitigation measures, including an endangered species conservation program, to compensate for continued water delivery to the Friant Division contractors and protect listed species.

1995 Interim Biological Opinion

The Interim biological opinion dated February 27, 1995 (Service File No. 1-1-95-F-39) provided coverage for 67 water service contracts (including 12 of the 28 Friant Division contracts covered

in the Friant opinion and 9 Cross Valley contractors) for a period of 3 years. The Service concluded that the Interim renewal of water contracts was not likely to jeopardize the continued existence of 21 listed species if mitigation measures as described by Reclamation were implemented. In addition, a number of Reasonable and Prudent Measures (RPM) were provided to reduce incidental take of listed species. Mitigation measures in the Project Description of this opinion formed the basis of commitments for subsequent Interim renewals (1998 and 2000), and for those commitments which are still ongoing and not fully implemented, are included as commitments in this opinion for long-term contract renewal.

1998 Interim Biological Opinion

In February 1998, Reclamation completed a supplemental EA to provide for renewal of 54 Interim contracts for a period of 2 years (February 1998 to February 2000) and the Service concurred with Reclamation that issuance of Interim CVP contracts for an additional 2 years was not likely to adversely affect newly listed species (Service File No. 1-1-98-I-383). In addition, the February 1998 Reclamation requested the Interim biological opinion be amended to include an additional 14 contractors of the Friant Division. The Service then determined that given the conditions specified in the Project Description (e.g., the deliveries of water will continue under the same terms as before), the Service concurred with Reclamation that issuance of Interim water contracts from February 1998 to February 2000 in the Friant service area would not likely to adversely affect newly listed species (Service File No. 1-1-98-I-595).

Between 1995 and 1998, the 67 contracts covered by the Interim opinion were reduced to 54 through consolidation, termination, or assignment, including a reduction of 1 contractor for the Cross Valley Division. During that time, the nine Cross Valley contractors were reduced to eight as a result of the Ducor ID becoming a subcontractor of the County of Tulare.

2000 Interim Contract Renewal

On February 29, 2000 the Service issued a biological opinion which addressed the effects of the proposed renewal by the Reclamation for the continued delivery of contracted water to 54 Interim contracts (including 12 Friant and 8 Cross Valley Division contracts) and 14 existing Friant Division water service contracts, in accordance with Section 3404(c) of the Central Valley Project Improvement Act (CVPIA), for a maximum period of 1 year, from March 1, 2000 through February 28, 2001 (Service File No. 1-1-00-F-0056) . This opinion covered water contracts within the Interim and Friant Division contract service areas for agricultural, municipal, and industrial purposes, that would not exceed water allocations identified by CVP operations criteria in February 2000, including any updates, and would not exceed historical maximum contract quantities analyzed in the Interim biological opinion of 1995 (Interim opinion), or the Friant biological opinion of 1991 (Friant opinion). To reach a no jeopardy conclusion for this opinion, the following actions discussed in the draft EA for this action were not covered by this opinion and may require separate section 7 or section 10 authorization:

- Mercy Springs partial assignment to Pajaro Valley Water Management District, Santa Clara Valley Water District, and Westlands Water District;
- Any future assignments involving Interim or Friant contractors;

- Transfers and/or exchanges involving Interim or Friant contractors;
- Inclusions and exclusions to Interim and Friant contract service area boundaries;
- Future changes in purpose of use from Ag only to Ag/M&I involving Interim or Friant contractors;
- Proposed increases above existing maximum contract quantities to Tehama-Colusa and Corning Canal contractors;
- Any increases in deliveries above actual allocations identified by CVP operations criteria in February 2000, including any updates, and above historical maximum contract quantities analyzed in the Interim biological opinion of 1995 (Interim opinion), or the Friant biological opinion of 1991 (Friant opinion).

2000 Biological Opinion on the Implementation of the CVPIA and Continued Operation and Maintenance of the CVP

This biological opinion addressed both operations and maintenance of the CVP and implementation of the CVPIA of 1992. The description of the Proposed Action was developed collaboratively by Reclamation and the Service and included, in part, a description of the proposed actions found in the Final PEIS for the CVPIA.

Commitments to uphold the ESA by both agencies, combined with implementation of these programs and meeting the assumptions of the effects analysis contributed to a conclusion of no jeopardy in this biological opinion. This no-jeopardy conclusion at the programmatic scale is not intended to, and does not, preclude the Service from making a future jeopardy determination based on the effects analysis for a site specific action. However, the (1) collection of data and monitoring, (2) communication, cooperation, and outreach, (3) conservation, restoration, compensation, and commitments to work together to recover listed species, and (4) site specific consultation all diminish the likelihood of future jeopardy opinions tiered under this programmatic biological opinion.

2001 Biological Opinion on the Long-term Renewal of Friant Division and Cross Valley Unit CVP Contracts

This biological opinion addressed the long-term renewal of CVP water service contracts with the Friant Division and Cross Valley Unit of the CVP consistent with section 3406(c) of the CVPIA, and for the period from 2001 to 2026. The description of the Proposed Action was developed collaboratively by Reclamation, the Service, and representatives of the Friant Division and Cross Valley Unit (Applicants) and included, in part, commitments made during other associated consultation processes.

Commitments to uphold the ESA by both agencies and the Applicants, combined with implementation of these programs and meeting the assumptions of the effects analysis contributed to a conclusion of no jeopardy in this biological opinion.

Description of the Proposed Action

Consistent with Reclamation law including, but not limited to, section 3404(c) of the CVPIA, Reclamation proposes to renew the Buchanan and Hidden Unit long term water service contracts of the CVP (authorized in 1962[1]) as is necessary for continued delivery of CVP water supplies for agricultural uses for a 25 year period from 2001 through 2026. Renewal of CVP contracts will also assist meeting the following purposes:

- Continued beneficial use of water, developed and managed as part of the CVP, with a reasonable balance among competing demands, including: irrigation and domestic uses; fish and wildlife protection, restoration, and mitigation; fish and wildlife enhancement; power generation; and other water uses consistent with requirements imposed by the State Water Resources Control Board and the CVPIA.

- Incorporate certain administrative conditions in to the renewed contract to ensure CVP continued compliance withe current Federal reclamation law and other applicable statutes.

- Allow the continued reimbursement to the Federal government for costs related to CVP construction and operation.

Background

The Buchanan and Hidden Unit CVP water contracts provide for delivery of CVP water supplies to service areas within the Friant Division which has been involved in Section 7 consultations for the delivery of CVP water supplies for many years. The Friant biological opinion of 1991 (Friant opinion) covered 28 CVP contracts in the Friant Division that were to be renewed over a 36 year period. Since 1991, 26 of the 28 contracts of the Friant Division and all of the Cross Valley Division contracts have been renewed for a number of Interim periods. The Interim biological opinion, dated February 27, 1995, provided coverage for 67 water service contracts (including 12 Friant Division contracts covered in the Friant opinion) for a period of 3 years. Between 1995 and 1998, the 67 contracts covered by the Interim opinion were reduced to 54 through consolidation, termination, or assignment. In February 1998, Reclamation completed a supplemental Environmental Assessment (EA) to provide for renewal of 54 Interim contracts for a period of 2 years (February 1998 to February 2000) and the Service concurred with Reclamation that issuance of Interim CVP contracts for an additional 2 years was not likely to adversely affect newly listed species. In addition, in February of 1998 Reclamation requested the Interim biological opinion be amended to include an additional 14 contractors of the Friant

[1] H.R. Rept. No. 2504 on H.R. 13273, at 217, and S. Rept. No. 2258 on S. 3773, at 292, 87th Cong., 2d Sess. (1962).

Division. The Service, given the conditions specified in the Project Description (e.g., the deliveries of water will continue under the same terms as before), concurred with Reclamation that issuance of Interim water contracts from February 1998 to February 2000 in the Friant service area would not likely adversely affect newly listed species. Then in November of 2000, the Service completed the programmatic consultation for *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*. This resulted in the acceptance and adoption of numerous conservation measures (commitments) that will be applied to tier actions for implementing CVPIA, like the long-term renewal of CVP water supply contracts. Finally, in January of 2001, the Service completed consultation for the long-term contract renewal of 28 Friant Division and 8 Cross Valley water contracts for a period of 25 years, again resulting in numerous commitments.

Coordinated Operations Agreement Between CVP and SWP

The Coordinated Operations Agreement is essential to establishing the baseline condition for this opinion. If changes in the Coordinated Operations Agreement are made that *may affect* listed species, Reclamation will initiate informal consultation with the Service and NMFS.

In 1986, the Coordinated Operating Agreement defined the rights and responsibilities of the CVP and SWP in meeting Sacramento Valley and Delta water needs, based on the water quality objectives specified in Decision (D)-1485. When water must be withdrawn from reservoir storage to meet Sacramento Valley in-basin requirements, 75 percent of the water is provided by the CVP and 25 percent is provided by SWP. When water from non-CVP/SWP sources and unregulated flow into the Delta is available for export in the Delta, the sum of CVP storage gains, SWP storage gains, and the available flow for export in the Delta is apportioned to give 55 percent to the CVP and 45 percent to SWP. If one party cannot use its share of available water, the other party may use the available water. When there is more than sufficient water to meet all Delta beneficial use standards, the Coordinated Operating Agreement allows the CVP and SWP to store and export as much of the additional water as possible within physical and contractual limits.

The State and Federal pumps at Tracy, together with the riparian water rights holders downstream (especially the Delta farmers) are capable of pumping at rates greater than the inflow to the Delta. This is compensated for by increasing the flows through the Central Valley by releasing more water from Reclamation reservoirs, particularly Shasta and Folsom.

A mechanism for measuring the balance of inflow and outflow in the Delta is determination of the location of increased salinity in the Delta, specifically 2.0 parts per thousand, which is referred to as X2. However, there is a lag time between the detection, or modeling, of upstream movement of X2 and the ability to shift X2 downstream. The location of X2 at or downstream of Chipps Island is the keystone of the Service's March 6, 1995, OCAP biological opinion (see that opinion for further discussion and details). It takes about three days for increased releases from Shasta to increase the outflows past Chipps Island. It takes a little more than a full day for increases from Folsom to reach Chipps Island. Currently, the pumps at Tracy are not slowed during the time between the detection of negative flows and the time when compensating releases balance the Delta pumping rate.

The four Federal pumps are each on or off. The State Water Project has 16 pumps, and each pump has an adjustable pumping rate. Combined operation of the two types of pumps, on\off or adjustable rate, affects how the "ramping down," or decreases in pumping rate can be accomplished during any periods when Delta inflows lag behind the pumping rate in the Delta, relative to the rate of release from Reclamation reservoirs. The current Coordinated Operations Agreement may not adequately provide for the configurations of how many pumps are on and the rate of pumping of the State pumps that are in use.

Contract and Facility Information

Each year, CVP water is provided from H.V. Eastman Lake of the Buchanan Unit, to Chowchilla ID, and CVP water is provided from Hensley Lake of the Hidden Division, to Madera ID. The long term service contract for Chowchilla WD specifies that the district will provide payment for 24,000 acre-feet of CVP water from the Buchanan Unit. Similarly, the long term service contract for Madera ID specifies that the district will provide payment for 24,000 acre-feet of CVP water from the Hidden Division. The 24,000 acre-feet in the contracts is based on the estimated long-term average yield projected in the planning documents for the two reservoirs. However, since the two reservoirs are filled completely by rainfall (not snow feed), CVP deliveries are determined by the timing and amount of annual rainfall and the available storage. Thus, the total delivery of CVP water has varied from 0 to almost 90,000 acre-feet for each of the contracts. Estimated releases to meet districts demands for the period between 1990 and 1997 are provided in Figures 2.1 and 2.2. Releases from the two reservoirs include flood control water, prior riparian water rights water, and conserved water (CVP water). The Corps of Engineers (COE) operates these reservoirs which provide mainly for flood control. Flood control releases occur each year through April to meet each reservoir's flood control criteria. Reclamation's permit allows for the storage of CVP water from December through April. With optimal rainfall timing, Hensley Lake could be filled to a maximum of 90,000 acre-feet. Usually the reservoir is holding 60,000 to 70,000 acre-feet on the 1st of June each year. The stored CVP water is released for irrigation purposes as needed by the districts, normally from May through October. After April, releases from the reservoirs include water to meet prior riparian water rights based on the inflow to the reservoir and releases to deliver CVP water to the contractors as part of their CVP contracts.

The agreement with the COE is that water storage will not encroach on the flood control space within the reservoirs and the storage space available varies depending on time of year and predicted rainfall conditions of the year. The flood control "season" begins in December and ends in April with the dam operators attempting by June 1st (if sufficient water is available in the optimal rainfall timing) to fill up the reservoir to maximize the water that is available subsequently for irrigation. Madera ID reports that for Hidden Dam (Hensley Lake) this has only occurred once in the last 25 years (1978). Usually the reservoir is holding 60,000 - 70,000 acre-feet each year on the 1st of June. From whatever volume is stored, a recreational easement as well as dead pool storage must be maintained. Therefore, the full stored volume is not available for delivery. From December first until March 15th, only 25,000 acre-feet can be in storage to allow sufficient space for potential flood flows. Stored water is distributed upon demand during the irrigation season, based on crop needs.

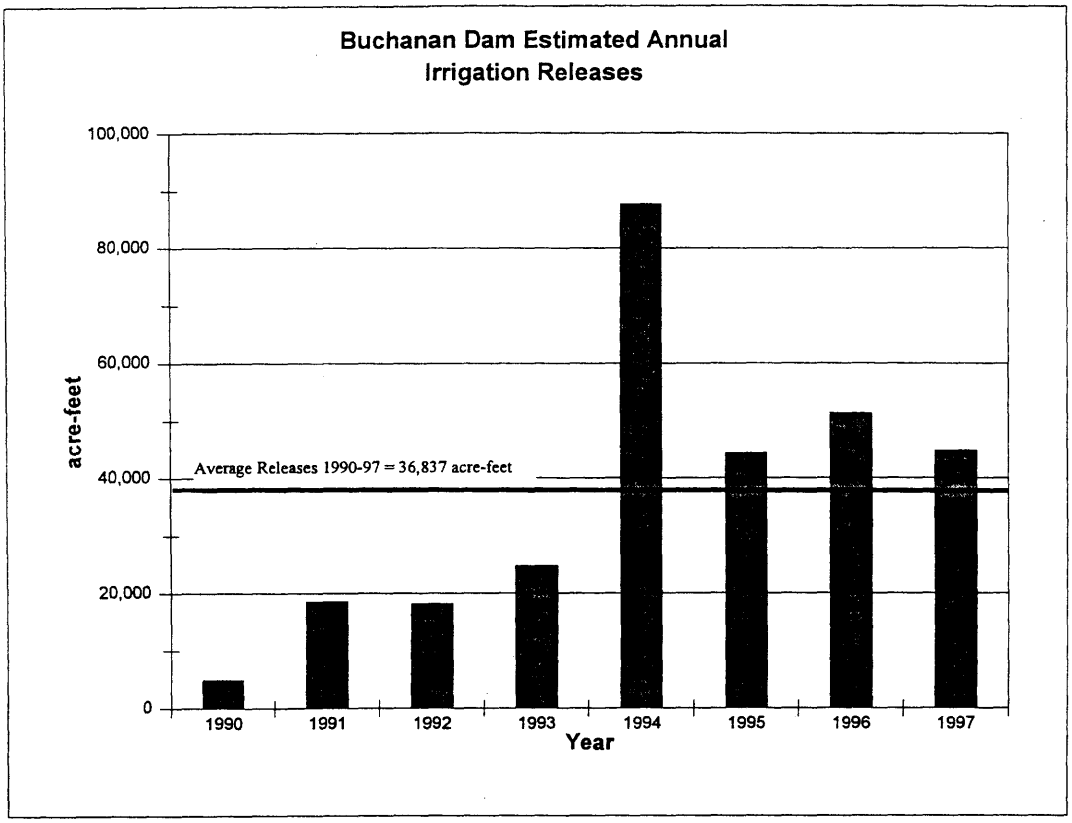


Figure 2.1

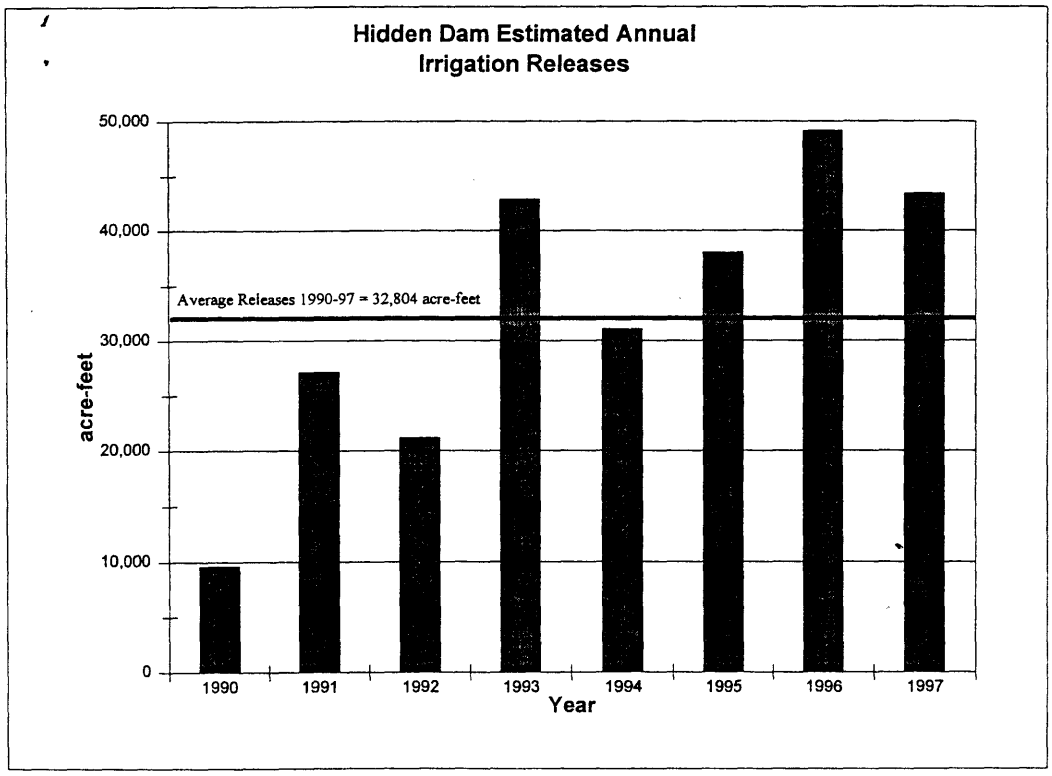


Figure 2.2

According to the water districts, the dam operations have not been modified for over 25 years. Prior to the building of the dams on the Fresno and Chowchilla Rivers, water only flowed after intermittent rain events, and were dry in the summer. In the last 25 years the rivers have flowed intermittently during the irrigation season in the reaches between the dams and the Madera Canal.

Contract Supply

The quantity of water to be made available to the contractors in this Project Description has remained the same as previous contracts with the Buchanan and Hidden Unit CVP water contracts. The amount of water available for delivery in any given year to CVP water service contractors is dependent upon hydrologic, environmental, and reservoir storage conditions. Full entitlements for both the Buchanan and Hidden Unit CVP water contracts vary from year to year (approximately 0 to 90,000 acre-feet), but could approximate the full stored volume, minus the recreational easements and dead pool storage at both reservoirs.

Water will continue to be delivered as a result of the Buchanan and Hidden Unit CVP water contracts in quantities that approximate amounts provided in Figures 2.1 and 2.2 and Table 2.1. Reclamation and the Service will coordinate on determinations of effects of annual water deliveries to CVP contractors. As provided for in the biological opinion on the Implementation of the CVPIA and Continued Operations and Maintenance of the CVP, Reclamation will provide information to the Service on annual deliveries each year, prior to or concurrent with informing the water districts on their allocation amounts. However, it is understood biological opinions for OCAP (1-1-94-F-70) and Los Vaqueros (1-1-95-F-117 and 1-1-95-F-134) are in place, and at no time can the total amount of these CVP deliveries exceed the total consolidated amount considered in these opinions. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these CVP deliveries *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of annual delivery information provided by Reclamation, the Service believes effects related to these CVP deliveries *may affect* federally listed species and/or their *critical habitat*, the Service will request Reclamation to consult under Section 7 of the ESA.

Purpose of Use

Water supplied by Reclamation to the Buchanan and Hidden Unit CVP water contractors is intended for two categories of use. "Irrigation Water" (Ag only) is water made available to be used primarily in the production of agricultural crops or livestock, including domestic use incidental thereto, and watering of livestock. "Other Water" is water from the CVP other than Irrigation Waters, as described in Appendix A, which is used for the purpose that is considered to be an irrigation use pursuant to State law such as watering of landscaping or pasture for animals (e.g., horse) which are kept for non-commercial uses. "Other Water" shall be paid for at Rates and Charges identical to those established for municipal and industrial water pursuant to the then current Municipal and Industrial (M&I) Ratesetting Policy.

Table 2.1 Buchanan and Hidden contractors, district size, maximum water entitlements and deliveries

BUCHANAN AND HIDDEN WATER CONTRACTORS INFORMATION								
Name	**Purpose of Use of Water (AG or M&I)**	**Gross Acreage in Water District Boundary**	**Current Irrigable Acres**	**Annual Entitlement Class 1 (acre ft/yr)**	**Annual Entitlement Class 2 (acre ft/yr)**	**Total of All Entitlements (acre ft/yr)**	**Annual Average Deliveries[1] (acre-feet)**	**Maximum Annual Delivery[1] (acre-feet)**
Chowchilla Water District	AG	85,619	78,435	55,000	160,000	215,000	72,969	168,709
Buchanan Contract	AG					>90,000[2]	NA[5]	>90,000[2]
Madera Irrigation District	AG	130,703	118,113	85,000	186,000	271,000	124,296	213,500
Hidden Contract	AG					>90,000[3]	NA[5]	>90,000[3]
TOTAL		**216,322**	**196,548**	**140,000**	**346,000**	**>666,000[4]**	**NA[5]**	**NA[5]**

[1] Annual Deliveries are the sum of Class 1 and Class 2 waters and supplies (average or potential) from Buchanan and Hidden Unit CVP water contracts.

[2] (>) Approximate maximum Buchanan Unit CVP water contract supply to the Chowchilla Water District.

[3] (>) Approximate maximum Hidden Unit CVP water contract supply to the Madera Irrigation District.

[4] Approximation - total of all entitlements assumes 100-percent delivery of Class 1 and 2 water and maximum supplies possible under the Buchanan and Hidden Unit CVP water contracts.

[5] Because data associated with historic Buchanan and Hidden Unit CVP water contract deliveries is limited and the ability to determine which type of water is being released is also limited, a meaningful estimation of the average and maximum annual delivery amount is not possible at this time.

Shortage Provisions

Reclamation proposes to deliver full contract entitlements when available. The Buchanan and Hidden Unit CVP water contracts provide for supplies to Chowchilla W.D. and Madera I.D. in quantities limited by current operation capabilities and hydrology. If there is a reduction in the total water supply available to contractors because of errors in project physical operations, drought, or other physical causes beyond the control of the United States, no liability will accrue to the United States or any of its officers, agents, or employees for any damages, except for such actions taken by the Contracting Officer which are arbitrary, capricious, or not made in good faith. In case of severe water shortage, agricultural deliveries may be reduced by up to 100 percent, if necessary.

Historically, approximately 90 percent of the CVP water has been delivered to agricultural users. In recent years, M&I usage of CVP water is increasing due to expansion of urban areas, changes in water contracts allowing conversion from agricultural to M&I uses, and the facilitation of increased water transfers by the CVPIA. In the future, the Service anticipates that a greater percentage of CVP contract allotment will be allocated to M&I uses. This conversion from agricultural purpose of use to M&I purpose of use of CVP water could place increasing demand on available water south of the Delta and could serve to limit the amount of water available for fish and wildlife purposes south of the Delta; thus impacting threatened and endangered species in the San Joaquin Valley.

If the interpretation and implementation of the shortage provisions described in this Project Description change, Reclamation will coordinate with the Service to ensure that such changes in shortage provisions do not adversely affect listed species.

Provisions of Negotiated Contract

The following table (Table 2.2) summarizes the contract provisions of the Buchanan and Hidden Unit long-term CVP renewal contracts. A representative example of each contract is attached in Appendix A. Water would continue to be delivered to CVP contractors through existing facilities. It would not involve the construction of any new facilities, the installation of any new structures, or the modification of existing facilities. The renewal of long-term contracts would continue to provide the existing supply for agriculture, municipal and industrial use. This biological opinion is based on analyzing the specific proposed actions contained in these contracts. These contracts will be executed on March 1, 2001 and will expire on February 28, 2026.

Table 2.2 Summary of contract provisions from interim contract (existing) and negotiated long term contract (proposed project) for Buchanan and Hidden Unit CVP water contractors

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Buchanan and Hidden Unit Contractors
Explanatory Recitals	No similar recital.	Assumes water rights held by CVP from SWRCB for use by water service contractors under CVP policies
	No similar recital.	Assumes CVP has been relied upon and considered essential by contractors
	No similar recital.	Assumes Secretary through coordination, cooperation and partnership will pursue measures to improve water supply
	No similar recital.	Assumes that loss of water supply reliability would have impact on socioeconomic conditions and change land use
Definitions		
"Charges"	Assumes to be payments in addition the Rates determined by the Contracting Officer each year.	Assumes rewording of definition of Charges to exclude both Rates and Tiered Pricing Increments
"Contract Total"	No similar definition.	Total of Class 1 and Class 2 Supply of Project Water
"Landholder"	Assumes to be entity owning lands served irrigation water.	Landholder described in existing Reclamation Law
"M&I Water"	Assumes to be for other than irrigation or to provide water for irrigation of land in units less than or equal to 5 acres as M&I water unless Contracting Officer satisfied use is irrigation.	Same as IRC
Terms of Contract - Right to Use Contract	Assumes subsequent interim renewal only for stated circumstances precluding a long-term renewal.	Assumes contracts shall be renewed subject to conditions for Ag and unconditioned for M&I Sets Dec. 31, 2024 as date on which determination on conversion may be made upon mutually agreeable terms
Water to be Made Available and Delivered to the Contractor	Assumes water availability in any year dependent upon existing conditions	Same as IRC.
	Assumes compliance with biological opinions and other environmental documents for contracting.	Assumes rewording to add requirement contractor is within legal authority to implement.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Buchanan and Hidden Unit Contractors
	No similar provision.	Assumes that current operating policies strive to minimize impacts to CVP water users
Time for Delivery of Water	Assumes methods for determining timing of deliveries	Assumes methods for determining timing of deliveries as in existing contracts
Point of Diversion and Responsibility for Distribution of Water	Assumes methods for determining point of diversion	Assumes methods for determining point of diversion as in existing contracts
Measurement of Water Within District	Assumes measurement for each turnout or connection for facilities that are used for all water supplies	Same as IRC
Rates and Method of Payment for Water	Does not include Tiered Pricing. Assumes advanced payment for rates for 2 months.	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for 2 months.
Non-interest Bearing Operation and Maintenance Deficits	Assumes either there is no non-interest bearing deficit or that agreement is in place to retire any non-interest bearing deficit.	Assumes language from existing contracts
Sales, Transfers, or Exchanges of Water	Assumes sales, transfers or exchanges with others. Does not discuss rates applicable to such actions.	Assumes continuation of transfers with rate for transferred water being transferor's rate adjusted for additional or reduced costs related to transfer and adjusted to remove any ability to pay relief.
Application of Payments and Adjustments	Assumes refund of overpayment after satisfaction of any accrued indebtedness upon contractor request.	Assumes minor changes associated with methods described for overpayment including requirement for $1,000 or greater overpayment for refund.
Temporary Reduction - Return Flows	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Buchanan and Hidden Unit Contractors
Constraints on Availability of Project Water	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.
Unavoidable Groundwater Percolation	Assumes that some of applied CVP water will percolate to groundwater	Same as IRC
Rules and Regulations	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Water and Air Pollution Control	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Quality of Water	Assumes that CVP will operate in accordance with existing rules without obligation to operate towards water quality goals	Same as IRC.
Water Acquired by the Contractor Other than from the United States	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Opinions and Determinations	Opinions and determinations not to be arbitrary, capricious or unreasonable. Parties may seek relief, adjustment, monetary damages if they are.	Assumes minor changes with respect to references to the right to seek relief
Coordination and Cooperation	No similar provision.	Assumes that coordination and cooperation between CVP operations and users should be implemented and CVP users should participate in CVP operational decisions. Parties retain exclusive decision making authority.
Charges for Delinquent Payments	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Equal Opportunity	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
General Obligation	Assumes that CVP will operate in accordance with existing rules	Assumes that CVP will operate in accordance with existing rules, however assumes no requirement for contractor to levy in advance

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Buchanan and Hidden Unit Contractors
Compliance with Civil Rights Laws and Regulations	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Privacy Act Compliance	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Contractor to Pay Certain Miscellaneous Costs	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Water Conservation	Assumes compliance with conservation programs established by Reclamation and the State	Same as IRC.
Existing or Acquired Water or Water Rights	Assumes that CVP will operated in accordance with existing rules	Same as IRC.
Operation and Maintenance by Non-federal Entity	Assumes non-federal entity will operate and maintain facilities and that certain payments to be made to that entity.	Assumes minor changes to language that would allow subsequent modification of operational responsibilities
Contingent on Appropriation or Allotment of Funds	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Books, Records, and Reports	Assumes that CVP will operate in accordance with existing rules	Assumes changes for record keeping for both CVP operations and CVP users
Assignment Limited	Assumes that CVP will operate in accordance with existing rules	Assumes changes to facilitate assignments
Severability	Assumes that CVP will operate in accordance with existing rules	Same as IRC
Resolution of Disputes	No similar provision.	Assumes a Dispute Resolution Process

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Buchanan and Hidden Unit Contractors
Officials Not to Benefit	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Changes in Contractor's Service Area	Assumes that CVP will operate in accordance with existing rules	Assumes changes to limit rationale used for non-consent with no set time limit for assumed consent
Notices	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Confirmation of Contract	Assumes that CVP will operate in accordance with existing rules	Assumes Court confirmation of contract and includes provision that contract not binding until court confirms is deleted.

COMMITMENTS FOR NEW AND CONTINUING ACTIONS

Reclamation and the Service have committed to numerous actions and processes in previous CVP water-related consultations associated with renewal of CVP water contracts in many consultation efforts under the ESA, including those for the Friant Division. Because the Friant Division, more specifically Chowchilla WD and Madera ID, is the destination of CVP contract supplies provided as a result of renewal of the Buchanan and Hidden Unit CVP water contracts, all the following commitments apply. In addition, the Applicants (Buchanan and Hidden Unit CVP contractors) have committed to activities associated with long-term renewal of their CVP water contracts and are thus identified below. Those conservation actions that have been fully implemented are considered a part of the Environmental Baseline condition in Chapter 3 and will be used to complete this biological opinion. Conservation actions that are ongoing or continuing, and any new commitments as a result of this consultation process, are included in this Project Description. It is assumed that the commitments described in this Project Description will be fully implemented.

In the Friant opinion of 1991, each subsequent Interim water contract renewal opinion (1995, 1998, and 2000) and the Programmatic CVPIA opinion of 2000, Reclamation provided numerous conservation measures in their Project Description and agreed to certain Reasonable and Prudent Measures (RPM) as summarized on Table 2.3. These measures resulted in the development and implementation of long-term and short-term conservation programs to minimize the adverse effects of continued water delivery to Interim contract renewal water districts.

Reclamation implemented the short-term program to protect listed species within the Friant and Interim contractor service areas because it was determined development of the long-term program would take several years to complete. This short-term program was intended to be in effect until components of the long-term conservation program could be developed and implemented.

Reclamation cooperated with the Service, in developing and implementing the long-term program to address the needs of listed species in the San Joaquin Valley. Reclamation and the Service identified a comprehensive approach to the recovery of all listed species throughout the San Joaquin Valley, including other Federal, State and local agencies willing to participate in its development.

Within the measures identified in the short-term and long-term programs, Reclamation committed to a process that will identify a comprehensive approach to recover listed species, with a Federal nexus to Reclamation, throughout the San Joaquin Valley. State, Federal, and private actions that adversely affect listed species can be mitigated by contributing to the long-term comprehensive program.

In the November 2000 programmatic opinion on *Implementation of the CVPIA and Continued Operation and Maintenance of the CVP*, November 21, 2000 (Service File No. 1-1-98-F-0124),

2000 Opinions	1998 Opinions	1995 Opinions	1991 Opinions	**TABLE 2.3 Summary of Reclamation, Service, and Applicant New and Continuing Commitments Associated with Renewal of Friant Division and Interim CVP Water Contract Renewals (1991 through 2001).** (Commitments include mitigation/conservation measures, Reasonable and Prudent Measures, and Terms and Conditions from prior related consultations)
				1. Commitments Specific to Buchanan and Hidden Unit CVP Contract Renewals
x	x	x	x	2. Develop a Critical Needs Plan identifying lands requiring immediate protection.
			x	3. Assist the Service to develop and implement a Comprehensive Recovery Plan for all listed endangered species in the San Joaquin Valley
			x	4. Develop a cooperative agreement to include all entities whose activities affect listed species in the San Joaquin Valley.
x	x	x	x	5. Issue notice of ESA requirements to CVP water contractors
x	x	x	x	6. Identify and map endangered species habitat in CVP contractor service areas and provide to contractors
x	x	x		7. Monitor land use change and ongoing activities within Districts receiving CVP water.
x		x	x	8. Landowners obtain Service/Reclamation approval prior to taking actions on endangered species habitat with no Federal involvement.
x			x	9. Ensure section 7 consultation on future actions impacting endangered species where there is Federal involvement.
x	x	x	x	10. Develop a plan to compensate losses of endangered species habitat since 1991 for Friant and 1995 for Interim contractors.
			x	11. Develop and Implement Conservation Plans
x	x	x		12. Review and amend Water Conservation Plans to ensure consistency with ESA
x	x	x	x	13. Develop a long-term program to address overall effects of the CVP and implementation of the CVPIA.
x	x	x	x	14. Complete and implement an Operations and Maintenance for activities associated with CVP water delivery and use.
x		x		15. Work with the California Department of Pesticide Regulation.
x	x			16. Identify sources of selenium in wetland water supplies and assess selenium effects on aquatic species from agricultural drainage discharged into the San Joaquin River and Delta.
x			x	17. Identify, analyze and compensate for past effects of contract service area boundaries changes, including inclusions and exclusions, since 1991 for Friant and 1995 for Interim contractors.
x				18. Identify and analyze impacts of changes in purpose of use since 1991 for Friant and 1995 for Interim contractors
x				19. Identify and analyze impacts of all water assignments executed since 1991 for Friant and 1995 for Interim contractors, and coordination on future assignments to ensure ESA compliance.
x				20. Reclamation will apply applicable criteria to all water transfers.
x				21. Develop and implement a Contingency Plan/Adaptive Management Program for implementing compensation commitments associated with losses of listed species habitat asa result of the delivery of CVP water.
				22. Other conservation measures (New)
			x	23. Curtail deliveries associated with discovery of conversion of native lands without consideration of ESA

2000	1998	1995	1991	**TABLE 2.3 Summary of Reclamation, Service, and Applicant New and Continuing Commitments Associated with Renewal of Friant Division and Interim CVP Water Contract Renewals (1991 through 2001).** (Commitments include mitigation/conservation measures, Reasonable and Prudent Measures, and Terms and Conditions from prior related consultations)
Opinions				
			x	24. Reclamation will amend all long-term contracts to include penalty provisions prohibiting any unauthorized take, conversion of wildland habitat , etc., and provides that Reclamation shall terminate delivery of water to the Contractor until such time as the issue is resolved.
			x	25. Reclamation shall consult with the Service on any deliveries of water using Friant facilities beyond that addressed in this biological opinion.

the Service and Reclamation agreed to numerous programmatic, comprehensive commitments that addressed future consultation, operation and maintenance, and conservation measures to minimize impacts to listed, proposed and candidate species. A complete list of the commitments from this programmatic opinion are found in Appendix B. Those commitments which more specifically apply to this Proposed Action are included later in this section.

The following Reclamation, Service, and Applicant commitments comprise conservation measures included in this Project Description. This consultation assumes these measures are fully implemented. Included with each commitment is the Service's assessment of their status (Status) and identification of those portions yet to be completed (Continuing Commitments). Reference is provided as to the origin (opinion) of each commitment.

1. Commitments Specific to Buchanan and Hidden Unit CVP Contract Renewals

The following are commitments associated with renewal of the Buchanan and Hidden Unit CVP water contracts. They provide clarity and emphasize similarities of this consultation with that of the Friant/Cross Valley consultation.

- There will be no changes in operations or any physical changes to the environment resulting from the renewal of these contracts.

- There are no additional service areas involved beyond those already analyzed, the water provided under the Hidden and Buchanan Unit CVP water contracts is applied to the same service areas as analyzed for Madera ID and Chowchilla WD.

- Friant contractors (including Madera ID and Chowchilla WD), as part of the project description, have committed to not delivering any CVP water to native habitats. Therefore there is anticipated to be no conversion of native habitat associated with use of any CVP water within these service areas or any other within the Friant District.

- All the various conservation measures included in the Friant Division project description, and included herein, are applicable to Madera ID and Chowchilla WD and thus to any Hidden/Buchanan Unit CVP water deliveries.

- As part of the project description Reclamation has committed to provide to the Service information on annual deliveries to Friant contractors. Should Reclamation determine that any deliveries would affect listed species consultation would be initiated. Likewise, the Service will also be reviewing this information, and should they determine that deliveries may affect listed species they will request that Reclamation initiate consultation. This coordination/ review commitment will provide further assurances that any effects that may be associated with Hidden/Buchanan Unit CVP water deliveries would be identified and addressed.

- Reclamation and/or the Service will identify any potential habitat restoration in riparian areas along the Chowchilla and Fresno Rivers. Appropriate projects identified in the riparian areas will be included in the mix of restoration projects evaluated by the various teams tasked with selecting which restoration projects will be funded and implemented.

- Reclamation will complete a process to determine the type of water released from Buchanan and Hidden dams (i.e., flood releases, water rights water, or CVP contract supplies), and to measure and record the quantity of water released for each purpose.

- Reclamation will work with the Service and the Corps of Engineers to consult on the Corps' Operation and Maintenance activities associated with Eastman and Hensley Lakes, within one year of this biological opinion. Both the Corps and Reclamation share responsibilities for Operations and Maintenance of storage and conveyance facilities associated with the Buchanan and Hidden Unit CVP water contracts. The Corps implements Operations and Maintenance for the reservoirs and Reclamation funds part of the construction cost and annual Operations and Maintenance costs allocated to irrigation. In addition to their interrelated and interdependent relationship to storage, conveyance, and delivery of CVP water supplies under the Buchanan and Hidden Unit CVP water contracts, Corps' operations do integrate with the ecosystem and associated listed species in the San Joaquin Valley. As an example, operations at Eastman Lake have been influenced by the presence of hydrilla (*Hydrilla verticillata*), a nonnative, invasive species that could, if allowed to reach the San Joaquin River and Delta, negatively impact numerous aquatic listed species. Additionally, several listed species exist within or adjacent to both lake project facilities.

2. Develop a Critical Needs Plan identifying lands requiring immediate protection.

a. *The Service and Reclamation will develop a Critical Needs Plan that will identify those lands requiring immediate protection to assure the continued existence of listed species in the San Joaquin Valley.* [1991 Friant Opinion - 1(a), and Reasonable and Prudent Measure/Term and Condition (3)]

Status: It is the goal of Interior to assure that listed species are being recovered. For any species affected by the CVP that are continuing to decline, the Service and Reclamation immediately set out to assess critical needs for the species and determine whether it was appropriate to expand the Conservation Program or implement other *conservation measures*. Reclamation and the Service used the best scientific and commercial information available, in conjunction with data from Reclamation and Service-funded research and aerial photograph analysis to monitor trends in the environmental baseline for listed species. Funding to implement the identified critical need actions came generally from three sources: through implementation of section 3406b(1) "other" of the CVPIA, the CVP Conservation Program (CVPCP), and Federal reimbursable funding associated with CVP operations and maintenance activities. Appendix C provides a list of actions and funding sources of past and on-going

projects to benefit listed species within the Friant Division, which includes service areas for Buchanan and Hidden Unit CVP water contracts, and Cross Valley Unit service areas.

As directed by the 1991 Friant and Interim biological opinions, the Service identified, and Reclamation implemented critical needs for listed, proposed, and candidate species impacted by the CVP. Critical needs plans were drafted for Friant and Interim biological opinions and that information was incorporated into the *Recovery Plan for Upland Species of the San Joaquin Valley, California.* The Recovery Plan was written to help identify recovery needs for listed species in the San Joaquin Valley and was largely funded by Reclamation water users in the Friant Division with some funding by the CVPIA (b)(1) "other" Program and Reclamation. Critical needs planning associated with species on Friant Division lands has made significant progress. Reclamation's South-Central California Area Office (SCCAO) continues to provide funding to collect data on critical needs species to meet obligations under the Friant biological opinion. Since the 1991 Friant opinion, numerous projects were developed and implemented to various degrees based on funding originating generally from the three sources identified above. Reclamation and the Service are continuing to update and address critical needs for listed species survival for all listed species impacted by the CVP. The last update of high priority species was provided by the Service to the Conservation Program team on January 27, 2000. Reclamation provided a table to the Service of the Conservation Program's FY 2000 Projects and b(1) other FY2000 Projects on July 7, 2000.

CVP Conservation Program (CVPCP) and 3406(b)(1) "Other". The CVPCP is a long-term program designed to meet the needs of special status species in the areas affected by the CVP. Reclamation is focused on providing the necessary resources for successful implementation of this program. In this regard, Reclamation has funded one full-time employee dedicated solely to the implementation of the CVPCP, and has initiated the funding process to support the program. Reclamation's annual budget includes approximately $2.4 million for implementation of the CVPCP, and a similar amount of funding is being requested in subsequent budget proposals.

In addition to the CVPCP, Reclamation and the Service have developed a program under section 3406(b)(1) of the CVPIA to mitigate for past impacts of the CVP not specifically identified in section 3406 of the CVPIA. The (b)(1) "other" Program (otherwise known as the Habitat Restoration Program) is responsible for mitigating for adverse environmental impacts. The Habitat Restoration Program contributes between $1 million and $2.5 million annually toward critical needs species and habitat restoration activities and a similar or greater amount of funding is being requested in subsequent budget proposals.

O&M Reimbursable Funds. Funding for site-specific ESA projects may be budgeted under O&M funding to address needs that may not be met by CVPCP and (b)(1) "other" funds. Reimbursable funding from implementation of the 1991 Friant biological opinion was used initially because the CVPCP program and (b)(1) "Other" had not yet been established as funding sources.

Continuing Commitments: Reclamation and the Service commit to continue updating and implementing critical needs for listed species survival for all listed species impacted by the CVP. Reclamation and the Service will pursue adequate funding and partners to implement critical needs actions identified through this process. Reclamation and the Service are continuing to pursue adequate funding and partners to implement critical needs actions identified through this process. Habitat mapping efforts identified in Item 5 below will be used to identify and prioritize lands for future acquisitions/easements.

Funding Priorities. As in previous years, the species which will benefit from this program will be those having critical needs as identified during the ESA Section 7 consultations, including the Long-term Renewal Water Contracts, and any other biological opinions that are in effect for the Friant Division water contractors. The Adaptive Management Committee (explained below) will continue to review the critical needs species and establish priorities for funding.

As part of the Interim and Friant biological opinions, Critical Needs Plans were written and that information was incorporated into the *Recovery Plan for Upland Species of the San Joaquin Valley.* The biological opinion programs which were committed to by Reclamation includes the stipulation that Reclamation would address the entire San Joaquin Valley.

In addition to projects funded by the Habitat Restoration Program, and as part of the commitment to implement the Interim biological opinion, Reclamation is reviewing existing information and sponsoring research on the presence of threatened or endangered species across the San Joaquin Valley, as funding permits. Projects include ongoing efforts to document the historic and current geographic distribution and population numbers of San Joaquin kit foxes, with a goal to identify and enhance corridors to allow passage between northern and southern California. Efforts have focused on assembling records not represented in the California Natural Diversity Data Base (NDDB), and also on mark and recapture population studies. Products resulting from these studies will include updated maps and NDDB records for the species completed, and annual reports. These projects will be part of the greater interagency cooperative effort to identify and enhance corridors for passage of kit foxes between northern and southern California.

Reclamation has provided funding for comprehensive recovery work for the kit fox, focusing on the development of wildlife corridors through areas where increasing pressure from development are expected to occur, and with Reclamation facilities in the area. Development of wildlife corridors is contingent on acquiring facts about the species anticipated to use the corridor. Reclamation has also provided funding for studies of kit fox use of agricultural land, and use of urban land (including canal rights-of-way) in Bakersfield, California. Much valuable information has been collected by these studies, and future management decisions will be able to use this information upon which to base their decisions. Future studies will be conducted as appropriate and as determined by the Adaptive Management Committee.

As discussed previously, projects associated with the Friant and Interim biological opinions include conducting various surveys to locate additional populations of sensitive, threatened, and endangered species. Surveys conducted in FY 1998 resulted in the discovery of the second known population of a rare plant: Keck's checkerbloom *(Sidalcea keckii)*. Subsequent funding from the CVPIA (b)(1) "Other" program allowed seeds to be collected and placed in a seed bank in the event of possible destruction of the original plant population. A coordinated effort with the Sierra Foothill Conservancy (Conservancy) and funding from the CVP Conservation Program and the Conservancy has made it possible to secure and protect 1,500 acres for Keck's checkerbloom.

Reclamation and the Service are working with other agencies to develop and implement a fire management plan for one of the only known population of the brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*), and has been conducting surveys to locate additional populations. Reclamation and the Service are leading partners in the development of a captive breeding program for riparian brush rabbits.

Reclamation commits to continuing the effort to identify and address critical needs species with a nexus to Reclamation. Reclamation is also making a continued commitment to involve other agencies (Federal, State, and local entities) in efforts to cooperatively address the needs of listed species. This will result in cost savings to all involved, will avoid duplication of effort, and will result in an improved cumulative benefit to species.

b. *Reclamation will identify lands that are critical to the continued survival of listed species and proposed species.* [1995 and 2000 Interim Opinions - 3(a)]

Status: Reclamation and the Service undertook a public process in 1995 to identify critical needs of species affected by the CVP (including Interim and Friant Division contractors) and to develop and implement a critical needs plan to address identified critical needs. Meetings were held on the giant garter snake, San Joaquin kit fox, large-flowered fiddleneck, California red-legged frog, contaminants, El Dorado County chaparral plants, palmated-bracted bird's beak, and vernal pool species. Reclamation and the Service agreed that high priority items would be best addressed in the context of a CVP-wide conservation program.

Reclamation and the Service developed the CVP Conservation Program as one of the means to offset the effects of the CVP on endangered species. During the consultation on Friant Division water contract renewals, Reclamation and the Service agreed to work together to solve endangered species problems. The Friant and Interim biological opinions specified that Reclamation and the Service would identify critical needs of the species. With time, it became clear the list of conservation actions to be done changed each year with new information. At the time of the Interim Water Contract Renewal consultation, Reclamation and the Service agreed to annually reexamine the list of actions to be done and identify which ones had the highest priority. This would ensure that important problems were not missed and that money would be used effectively to solve problems. The CVP Conservation Program Framework

Document was written to confirm the strategy. All of the species in the area affected by the CVP were included because spending decisions would be done most cost-effectively during the prioritization process. Participation by both agencies would ensure that the interests of Reclamation and the Service would be considered in all decision-making.

The Conservation Program, along with other initiatives [e.g., (b)(1) "other" Program, acquisition of level 2 and level 4 Refuge Water Supplies, and the Wetland Development Program] are intended to ensure that the existing operation of the CVP and implementation of the CVPIA would not jeopardize listed or proposed species or adversely affect designated or proposed critical habitat.

Continuing Commitment: Reclamation and the Service commit to **continue updating and implementing** critical needs for the survival of all listed species impacted by the CVP. Reclamation and the Service will pursue adequate funding and partners to implement critical needs actions identified through this process.

c. *Reclamation, working with the Service, will implement critical needs plans* [1995 and 2000 Interim Opinions - 3(b)].

Status: Critical needs plans were drafted for Friant and Interim biological opinions. The Recovery Plan for Upland Species of the San Joaquin Valley, California was partially funded by the CVPIA (b)(1) "other" Program and Reclamation to help identify recovery needs for listed species in the San Joaquin Valley. Critical needs planning associated with species on Friant Division lands has made significant progress. Reclamation's south- central California Area Office continues to provide funding to collect data on critical needs species to meet obligations under the Friant biological opinion.

Continuing Commitment: Reclamation, as necessary, will expand their critical needs efforts to ensure the existing operation of the CVP (including Interim contractors) will not jeopardize listed and proposed species or adversely affect designated or proposed critical habitat.

3. Assist the Service to develop and implement a Comprehensive Recovery Plan for all listed species in the San Joaquin Valley.

a. *The Service will develop a Comprehensive Recovery Plan that includes all listed endangered species in the San Joaquin Valley. Reclamation will assist in developing the recovery plan and its implementation.* [1991 Friant Opinion - 1(b)]

Status: See 1(a) above. The final *Recovery Plan for Upland Species of the San Joaquin Valley, California,* was released by the Service in 1998.

Continuing Commitment: Reclamation, if shown to be necessary, will assist in the development of new recovery plans if additional species are identified that may be affected by Reclamation's operation of the CVP.

b. *Reclamation will, as a component of a broader planning program, implement items identified in the recovery plan that are Reclamation's responsibility. Also, Reclamation will cooperate in conducting the population viability analysis.* [1991 Friant Opinion - 1(c)]

Status: Reclamation has continued to implement items identified in the Recovery Plan in (a) above that are Reclamation's responsibility. Reclamation has shown a pro-active approach to this effort and has addressed species prior to their listing. Reclamation contributed significantly to the protection of the Keck's checker mallow by providing funding that was used to establish the only known protected population of the plant. Examples of Reclamation's actions were provided to the Service in the Program Implementation Progress Report, December, 2000, and are found in Appendix C of this Document.

Continuing Commitment: Reclamation will continue to implement items identified in the recovery plan that are Reclamation's responsibility. The adaptive management team will work cooperatively to continue this commitment.

4. Develop a cooperative agreement to include all entities whose activities affect listed species in the San Joaquin Valley.

a. *Reclamation will work with the Service to develop a Cooperative Agreement to include all entities whose activities affect listed species in the San Joaquin Valley.* [1991 Friant Opinion - 1(d)]

Status: A single cooperative agreement did not prove to be an effective method to work with other agencies for a variety of reasons. However, Reclamation has used agency-specific agreements extensively with other agencies to jointly fund cooperative efforts to address species' needs in the San Joaquin Valley and in other areas of the CVP. This has proven to be a satisfactory approach.

Continuing Commitment: Reclamation will continue to seek cooperative efforts to address the recovery of species in the San Joaquin Valley. This will result in a cost savings for all cooperators as well as a more holistic approach toward listed species recovery.

5. Issue notice of ESA requirements to CVP water contractors

a. *Reclamation and Service will issue notices to all Friant contractors regarding the imperative of protecting all remaining habitat of listed species in the Friant Service area within 30 days after receipt of the final Opinion.* [1991 Friant Opinion - 2(a), and Reasonable and Prudent Measure/Term and Condition - (1)]

Status: Complete on November 15, 1991, a notice was issued jointly by Reclamation and the Service to Friant Division contractors regarding the imperative of protecting all remaining habitats of listed species in the Friant service area.

b. *Notify Districts regarding ESA requirements of the Interim opinion.* [1995, 1998, and 2000 Interim Opinions - 1(a)]
Status: Within the first year of the issuance of the 1995 Interim contract renewal opinion, Reclamation completed the following: included language in Interim contracts requiring compliance with applicable biological opinions; sent a copy of the Interim contract renewal opinion to all 65 Interim contractors; and held workshops in Folsom, Kingsburg, Tracy, and Willows to explain the compliance requirements of the ESA.

Associated with the 2000 Interim contract renewal process, the Service and Reclamation believed additional communication was necessary with Interim and Friant Division contractors to identify their obligations to comply with the ESA. As a result, Reclamation and the Service jointly developed and distributed a letter to "interested parties" on July 6, 2000, describing Interim and Friant Division renewal contractor requirements to comply with ESA. Further, existing language in the Buchanan and Hidden Unit long-term CVP contracts (within this Project Description) includes the following, "The contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding execution of this contract undertaken pursuant to Section 7 of the ESA, as amended..."

6. Identify and map endangered species habitat in CVP contractor service areas and provide to contractors

a. *Reclamation, in cooperation with Service, will initiate a comprehensive biological survey of Reclamation and private lands in the Friant service area to ascertain the distribution of all remaining habitat of listed species, and upon full implementation will notify all contractors of the location of wild lands suitable for listed wildlife species.* [1991 Friant Opinion - 2(b), and Reasonable and Prudent Measure/Term and Condition (2)]

Status: Reclamation, with the assistance of the Endangered Species Recovery Program (ESRP), initiated a comprehensive biological survey of Reclamation and private lands (with signed permission from landowners), in the Friant Division service area, to ascertain the distribution of all remaining habitats of listed species. Contractors who allowed surveys to be conducted were sent a letter stating the results of the surveys. Reclamation continues to conduct surveys on lands where appropriate and where signed permission is obtained from the landowner.

Continuing Commitment: Reclamation decided to continue this effort established with the 1991 Friant Division water contract renewal opinion and provide information to the water users and public on the significance of wild lands for the survival of threatened and endangered species.

b. *Synthesize existing and new information on distribution and potential habitat of federally listed, proposed, and candidate species within the Districts.* [1995, 1998, and 2000 Interim Opinions - 1(b)]

Status: Reclamation, working with the Service, has entered "available information" into GIS format. Reclamation is working on combining the Service's species data base with databases from CDFG and CNPS.

Continuing Commitment: The Service and Reclamation have determined that additional work on this mitigation measure is needed and is better defined in the status and commitments section of 5(c) and (d) below.

c. *After the information in item* [(a) and (b) above] *is developed, Reclamation and the Service will provide maps delineating the endangered species habitat to each Contractor for their service area.* [1991 Friant Opinion - 2(c)]

d. *Map (hard copy and digitized) habitat and potential distribution of listed, proposed and candidate species, and provide information to the Districts, the Service, and the California Department of Fish and Game.* [1995, 1998, and 2000 Interim Opinions - 1(c)]

Status: Progress was made on these commitments from the 1991 Friant Division and the 1995, 1998, and 2000 Interim contract renewal opinion processes. Maps were included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California.* However, the maps were insufficient to fulfill the complete needs of the action.

Continuing Commitment: Reclamation and the Service have committed to complete the following related activities prior to the end of FY 2003. :

- Establish listed and proposed species habitat baseline and estimated trends for Interim water contract service areas and the Friant service area ;
- Establish listed and proposed species habitat baseline for Friant water contract service areas;

- Notify contractors in writing of the listed and proposed species habitat within contract service areas;
- Establish listed and proposed species habitat baseline within CVP contract service areas;
- Calculate and compile a report showing trends in listed and proposed species baseline habitat for the Friant and Interim water contract service areas and the other combined CVP contract service areas.

In addition to continuing commitments identified for mapping of habitat and potential distribution of listed, proposed, and candidate species associated with the 1991Frinat opinion, the following provides additional information and commitment.

Reclamation and the Service have committed to developing a Comprehensive Mapping Program, consistent with existing biological opinions including the Friant and Interim contract renewals, to identify remaining natural habitats within CVP service areas and identify any changes within those habitats that have occurred between 1993 and 1999. Reclamation will seek funding for this program.

To be consistent with the 1991 Friant biological opinion, and its 1992 amendment, and subsequent Interim contract renewal opinions, Reclamation will complete comprehensive mapping of all lands in CVP service areas to identify all remaining potential habitat for listed species by May 2002. The mapping, so generated, will be used to assess impacts to listed species. Reclamation and the Service are actively developing a mapping strategy. Contractors subsequently will be notified of the location of wildlands suitable for listed species.

Reclamation will work with and provide support to the Service to map listed species baseline habitat, or will contract with a Service approved party that has sufficient local area expertise to complete the mapping. The maps will consist of a GIS layer of potential habitat for each identified listed or proposed species . The use of additional data (including satellite imagery, other aerial photographs, soil maps, vegetation maps, etc.) may be necessary to help identify suitable habitat. Reclamation will ensure that mapped listed species baseline habitats are digitized and will provide the digitized layer to the Service or fund the Service to digitize the maps. Using the digitized data, the Service will provide Reclamation, the water districts, any member agencies, planning departments of cities and counties within the water districts, and other responsible parties copies of maps of potential habitat for listed species.

By May 2002, the three phases described below will be completed. Once the habitat is located and quantified, CVP Contractors and State and local agencies with jurisdiction over land use planning decisions will be notified of the comprehensive three phase mapping strategy. Mapping will be used to quantify listed species habitat within the service area of the water districts.

Habitat Monitoring Three Phase Program:

Phase I - A 1993 landcover database or basemap will be developed using the best available existing landcover data and satellite imagery. Classification of land or habitat types represented in the CDF&G/Ducks Unlimited database will be used for wetland types, and WHR (Wildlife Habitat Relationships) classification types will be used for upland types. Classification types will be correlated with the National Biological Diversity Database for determining species habitats. As part of Phase I, a demonstration area will be chosen to develop and test methods, procedures, and products.

Phase II - will determine areas of habitat change by comparing 1993 image data to year 2000 image data. Based on available GIS datasets and spectral change analysis, a preliminary change map will be created to guide sampling and remapping efforts in phase III.

Phase III - will create an updated landcover database representative of landcover and habitat conditions for year 2000. This process may include:

- Field sampling to determine the cause of change and identification of habitat types in change areas.
- Acquisition of large scale, orthorectified digital aerial photography for verification and remapping purposes.
- Additional mapping efforts in areas where existing datasets from 1993 are not adequate to meet the needs of this project.
- GIS analysis for habitat change monitoring

Additionally, Reclamation and the Service commit to revisit and update the land cover database for year 2000 every 5 years for monitoring and trends analysis purposes.

7. Monitor land use change and ongoing activities within Districts receiving CVP water.

a. *Monitor land use changes and ongoing activities in the Districts to ensure that project water is not used in a manner that adversely affects listed, proposed, and candidate species.* [1995 and 2000 Interim Opinions - 1(d)]

Status: To date limited progress had been made on this measure. However, the mapping efforts which have just begun will assist the ability to monitor land use changes.

Continuing Commitment: Using data from the Comprehensive Mapping Program and aerial photo analysis, Reclamation will work with the Service to develop a Land Use Monitoring and Reporting Program soon as technically possible, Data from the monitoring will be used to update the environmental baseline, assess impacts of Reclamation actions on listed species, and determine compensation measures

Reclamation commits to the development and implementation of a Land Use Monitoring and Reporting Program, as funding and authorizations allow. Reclamation will seek base funding for this program.

Reclamation will work with the Service to provide maps produced as a result of the Land Use Monitoring and Reporting Program as soon as technically possible, to CVP water districts and county planning departments including updates of any new data from the Service.

The Land Use Monitoring and Reporting Program will be implemented immediately to test and track, for the purpose of validating over the life of the project, the assumptions made in this biological opinion that the baselines of the species on Table 1.1 are stable or increasing.

Monitoring will be used to assess the condition and impacts of Reclamation actions on listed species. Reclamation and the Service are actively developing a monitoring strategy based on

the comprehensive mapping program. The land cover database for year 2000, described in Phase III above, will be revisited every 5 years for monitoring purposes.

One use of this program is that changes and trends in potential listed species habitat will be reviewed by the CVP Conservation Program's technical team and will be used to determine the effectiveness of the CVP Conservation Program and other local planning efforts in protecting and recovering listed species. This will help focus conservation efforts on acquisition needs with the highest priority. In addition, the team will identify other priority needs that are not habitat related. As needs for information gathering or additional interagency coordination needs are identified, the Service and Reclamation will put programs in place or bolster existing programs to meet those needs.

Reclamation and the Service will use the best scientific and commercial information available, in conjunction with data from aerial photograph analysis to monitor trends in the environmental baseline for listed species. It is the ultimate goal of Interior to assure that listed species are being recovered. For any listed species affected by the CVP, the Service and Reclamation will immediately assess its critical needs and determine whether the existing Conservation Program needs to be expanded to address the identified critical needs or if implementation of conservation measures would be adequate. The conversion of native habitat to agricultural or municipal/industrial uses within contractor service areas, without prior biological surveys as required by Reclamation prior to the delivery of CVP water, will be evaluated to determine required mitigation.

8. Landowners obtain Service/Reclamation approval prior to taking actions on endangered species habitat with no Federal involvement.

a. *The Service and Reclamation will notify the Contractors of the procedures to be followed if their actions will have impacts on endangered species habitat lands in cases where there is no Project water involved.* [1991 Friant Opinion - 2(d)]

b. *Reclamation, working with the Service, will develop and distribute to the Districts and landowners guidance on construction and maintenance activities that are most beneficial to listed, proposed, and candidate species. Complete within 1 year of contract renewal. Reclamation will commit to completing site-specific operations and management plans and distributing them to District's* ***within 1 year of this opinion.*** [1995 and 2000 Interim Opinions - 2(b)]

Status: Reclamation did provide notice to Friant and Interim contractors regarding their responsibilities associated with the ESA (identified in 4 above) and has written 3 CVP-wide documents that constitute an O&M Plan:

- Operation and Management Plan: an Overview;
- Operations and Management Plan: Field Manual;

- Operations and Maintenance Plan: Sensitive, Threatened, and Endangered Species.

This "plan" will cover associated Operations and Maintenance activities on landowners, district, and Reclamation lands. Each Area Office is developing site specific operations and management plans and these plans will be made available to water contractors and managing partners.

Continuing Commitments: Implementation of this measure is progressing, but is behind the schedule as provided within the Interim contract renewal opinion, (b) above. Reclamation will commit to completing site-specific operations and management plans **within 1 year of this opinion.** In addition, manuals will be distributed to Districts and managing partners **within 1 year of this opinion.** Additionally, Reclamation continues to work with water districts for the completion and implementation of agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).

9. Ensure Section 7 consultation on future actions impacting endangered species where there is Federal involvement.

a. *Reclamation and Service will notify Contractors of the procedures to be followed if their actions will have impacts on endangered species habitat lands in cases where the use of project water is contemplated.* [1991 Friant Opinion - 2(e)]

Status: As per Item 4, Friant Division and Interim CVP contract renewal contractors have been notified regarding their requirements to comply with ESA, including those pertaining to the delivery of CVP water supplies. Further, existing language in the Buchanan and Hidden Unit long-term contracts (this Project Description) includes that, "The contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding execution of this contract undertaken pursuant to Section 7 of the ESA, as amended..." The Buchanan and Hidden Unit CVP water contractors, whose contracts are currently up for renewal, have also made "Applicant Commitments" that they will not deliver CVPIA Project Water for the purpose of converting any native lands to agricultural or M&I uses unless and until appropriate ESA compliance has determined that such conversion will not likely affect protected species or appropriate mitigation has been provided (Item 22).

Continuing Commitment: Procedures will also be included in the Operations and Maintenance Plans discussed in Item 13.

10. Develop a plan to compensate losses of endangered species habitat since 1991 for Friant and 1995 for Interim renewal contractors.

a. *Reclamation will develop a Compensation/Implementation Plan in cooperation with Service. The objective of this plan will be to offset impacts to endangered species that occur within the*

Contractor's service area between 1/1/91 and the date of the notice in Item 4 above. [1991 Friant Opinion - 2(f)]

Status: Reclamation determined the amount of habitat lost between 1/1/91 and the date of the notice in Item 4. By agreement between Reclamation and Service, resolution of the amount of acreage necessary to mitigate converted areas has not been finalized and is pending development of policy to address such land conversions. That development effort is in progress, and its implementation will be included in efforts associated with the Continency Plan/Adaptive Management Program as defined in Item 20.

In the quarterly Interim Opinion Status Report Tables received by the Service on July 7, 2000 and October 19, 2000, Reclamation noted the contingency plan to address impacts to species or their habitats within the Interim and Friant Division's contract service area was "in development".

Continuing Commitments: Reclamation will finalize and implement the policy on land conversion as mentioned in (a) above. Reclamation and the Service will agree upon an appropriate mitigation for the lands converted from April 1990 (closest date of available photos to January 1991) to October of 1992. Reclamation will finalize these compensation measures, in coordination with the Service, within 3 months of this opinion and will ensure completion of these measures within 3 years of this opinion.

Reclamation and Service have agreed that conversions of habitat within the Friant districts, including service areas for Buchanan and Hidden Unit CVP water contracts, that have occurred from 1991 to present, and Interim renewal CVP districts from 1995 to present, will be identified as to owner, number of acres and type of habitat that was converted. Compensation for those conversions can take the form of, but is not limited to, protection of native habitat by fee title acquisition, conservation easement, land retirement, and enhancement of existing preserved land (upon approval). The form of compensation shall be formalized through written agreement between the contractor and Reclamation.

Guidelines to address compensation for conversion of native habitat are being developed to address the conservation requirements applicable to the use of CVP water associated with conversion of land from native vegetation to agricultural, municipal, or industrial development within the CVP service area administered by the South-Central California Area Office of Reclamation. Conversion of such land has the potential for destroying endangered or other sensitive species habitat, and if such conversion is facilitated by the delivery of CVP water, any loss of endangered or other sensitive species habitat must be avoided through a mitigative action. Mitigation in this reference is taken to mean avoid, minimize, and compensate.

Conversion of endangered or other sensitive species habitat associated with CVP water deliveries may continue in the future. Reclamation and the Service believe landowners implementing these types of land conversions, should they occur, must provide compensation through preservation and restoration/creation. To provide an incentive for landowners to

furnish the conservation measures in good faith, the ratio of the compensation can be reduced when considered in the context of location. This ratio reduction would have to be evaluated on a case-by-case basis by the Service.

The conservation guidelines will meet commitments made by Reclamation under the 1991 Friant opinion and Term and Condition V of the 2000 Interim Opinion and will be the standard approach applied for endangered or other sensitive species habitat where there is a nexus of present or future delivery of CVP water in the San Joaquin Valley. The guidelines will be reviewed every three years and changes will be made and implemented as appropriate.

11. Develop and implement Conservation Plans

a. *An Interim Conservation Plan will be developed and implemented to avoid adverse effects on listed species and their habitat until the long-term program identified in Item 12 is developed. The Interim Conservation Plan will consist of three components. First will be an expanded Compensation Plan which will include appropriate compensation under Items 16(a) and 16(b). Second will be the identification of critical endangered species habitat lands within the Contractor's service area. Third will be the development of a Cooperative Agreement to implement the Interim Conservation Plan.* [1991 Friant Opinion - 2(g)]

Continuing Commitment: As a component of their endangered species conservation program, Reclamation will identify and manage Reclamation lands for endangered species purposes consistent with CVP operations. Most other items considered in associated planning efforts within Items 1-24 could be a part of the long-term Conservation Plan.

12. Review and amend Water Conservation Plans to ensure consistency with ESA

a. *Reclamation will review water conservation plans for the Districts prior to implementation to ensure they do not adversely affect listed, proposed or candidate species.* [1995 and 2000 Interim Opinions - 2(c)]

Status: The first Status Report for the Interim opinion noted that all water conservation plans for Interim contracts were reviewed prior to implementation. Reclamation determined that no activities implemented during the first year would affect listed species. (Also see status of Item (b) below).

The CVPIA requires that all surface water delivery systems with its [district] boundaries are equipped with water measuring devices or water measuring methods of comparable effectiveness acceptable to the Secretary. The conservation criteria have requirements that Districts have appropriate water measurement devices. All District conservation plans have been deemed consistent with the Reclamation's criteria.

The Water Management Plan *Criteria* are due to be revised in 2002 in conjunction with the CVPIA requirement that no later than every 3 years the *Criteria* be changed or amended. This

was last done in 1999. Reclamation has initiated informal consultation between its Region area office Water Conservation Specialists and the Service regarding changes suggested for the revision of these *Criteria.* Sacramento office of Water Conservation has concurred that the Service will be contacted and included in the revision of current Water Conservation Plan Criteria as part of the Adaptive Management Plan committed to by Reclamation. These discussions are now ongoing and Service will be asked for their input on revisions and/or existing criteria and how they may affect ESA issues. This informal discussion with Service will begin immediately upon the date of this Opinion.

On July 7, 2000, Reclamation provided the Service with the following water conservation plan information:

- Water Management Plan Information - Zip drive containing the 2000 implementation plans/reports and the current Water Management Plans;
- Notice of "3 Public Workshops" to assist water contractors in meeting the 1999 Standard Criteria;
- Reclamation's Standard Criteria for Evaluating Water management Plans, 1999
- Interested Parties Letter for review of draft "Criteria for Evaluating Water Management Plans 1999" Public Notice;
- CUWCC Annual Report - 1999
- "Water Management Planning in the Central Valley Project" developed to meet the 1996 Standard Criteria;
- Water management Planner: Guidebook, Plan Format, and Supporting Software developed to meet the 1999 Standard Criteria;

Continuing Commitment: Reclamation will coordinate with the Service on future water conservation plans and amendments prior to implementation to ensure that these plans comply with ESA. Conservation measures will be implemented by both Reclamation and the water districts to ensure that long-term use of contract water does not degrade baseline conditions of listed species.

b. *Reclamation will amend the criteria for water conservation plans to ensure consistency with the ESA.* [1995 and 2000 Interim Opinions - 2(d)]

c. *Reclamation will provide a status update* ***May 28, 2000*** *regarding the water conservation criteria revision.* ***By August 28, 2000,*** *Reclamation will revise the criteria in coordination with the Service to ensure compliance with the ESA.* [2000 Interim Opinion - 2(d)]
Status: The criteria for evaluating water management plans was completed in September 1996. Comments from the Service were considered in developing the final criteria. However, although the criteria were earmarked to be revised to ensure that protection of listed, proposed, and candidate species during the April 1996 revision process, the annual status reports for the Interim opinion indicate that the revision was not completed.

On July 7, 2000, Reclamation provided the Service with the following water conservation plan information as referenced in (a) above.

Since the Interim Opinion of 2000 was issued, it was determined this effort had been completed in 1996. Reclamation has initiated informal consultation between its Region area office Water Conservation Specialists and the Service regarding changes suggested for the revision of these *Criteria.*

Continuing Commitment: **Within 6 months of this opinion,** Reclamation will revise the criteria in coordination with the Service to ensure compliance with the ESA.

13. Develop a long-term program to address overall effects of CVP and implementation of the CVPIA

a. *Reclamation will develop and implement a long-term plan to prevent/minimize take and contribute to the survival of listed species throughout the San Joaquin Valley.* [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition - (6)]

b. *Reclamation, working with the Service, will develop a long-term program to the address overall effect of the CVP and implementation of the CVPIA.* [2000 Interim Opinion - (4)]

Status: Reclamation has been undertaking actions that have significantly contributed to the survival of listed species throughout the San Joaquin Valley. Reclamation has also been implementing measures to prevent/minimize take of species through operations and maintenance actions.

The Service, with assistance from Reclamation, completed a biological opinion on the Implementation of the CVPIA and Continued Operations and Maintenance of the CVP . Reclamation's annual budgets have included approximately $2.5 million annually since 1998 for critical needs.

Continuing Commitments: Reclamation and the Service will pursue adequate funding and partners to implement any requirements included in the final biological opinion on the Implementation of the CVPIA and Continued Operations and Maintenance of the CVP .

14. Complete and implement an Operation and Maintenance Plan(s) for activities associated with CVP water the delivery and use.

a. *Reclamation, working with the Service, will develop and distribute to the Districts and landowners guidance on construction and maintenance activities that are most beneficial to listed, proposed, and candidate species. Complete within 1 year of contract renewal.* [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition - (4), and 1995 and 2000 Interim Opinions - 2(b)]

Status: Implementation of this measure is progressing, but is behind from the dated timeline of the 2000 Interim opinion. Reclamation, working with the FWS, completed operation and maintenance (O&M) manuals providing guidance on how daily activities can best be conducted with minimal impacts on sensitive species. The entire Operations and Maintenance Plan consists of four documents; this document, the *Operations and Maintenance Plan: Overview*, is intended for use in Management and Planning. The other documents *Operations and Management Plan: Field Manual*, *Operations and Management Plan: Site Specific Information and Procedures*; and *Operations and Maintenance Plan: Sensitive, Threatened, and Endangered Species* are designed to be taken into the field and used on a daily basis by operations and maintenance staff and resource staff. Each Area Office is developing site specific operations and management plans and these plans will be made available to water contractors and managing partners.

To compliment these documents, training is received by staff and contracted operations and maintenance staff concerning the identification, distribution, and habitats of endangered, threatened, and sensitive species. This training was originally provided by Reclamation but is now being provided by the Department of Pesticide Regulations. The Bureau of Reclamation will also assist water districts and private land owners receiving Bureau of Reclamation water in adhering to appropriate avoidance and mitigation measures by making copies of the documents available to them.

Continuing Commitment: Implementation of this measure is progressing, but is behind the date identified in the Interim opinion. As a result, Reclamation will commit to completing site-specific operations and management plans within 1 year of this opinion. For the Friant Division, including Chowchilla WD and Madera ID, these consultation processes will involve Operation and Maintenance activities on Federal, District, and landowner facilities. Manuals will be distributed to Districts within 1 year of this opinion. Progress will be evaluated by the adaptive management team. Additionally, Reclamation continues to work with water districts for the completion and implementation of agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).

Operation and Maintenance activities have been addressed using a phased approach. Phase I consists of procedures which are to be followed on United States lands administered by Reclamation and were effective within three months of the date of the Friant biological opinion. Phase II addresses the identification of sensitive sites and the creation of site-specific measures to avoid adverse impact to those species. Phase III addresses the establishment of Integrated Pest Management procedures and the implementation of erosion control plans on Reclamation lands (Integrated Pest Management procedures stress managing a pest's environment and using a minimum of pesticides). The schedule for beginning implementation of phase I was three months following the date of the Friant opinion. Full implementation of phases II and III was to begin by the end of 2001; Updates in procedures will be adopted as

needed with a report of new implementation actions provided to the Fish and Wildlife Service annually.

Reclamation will work with the Service and the Corps of Engineers to consult on the Corps' Operation and Maintenance activities associated with Eastman and Hensley Lakes, within one year of this biological opinion. Both the Corps and Reclamation share responsibilities for Operations and Maintenance of storage and conveyance facilities associated with the Buchanan and Hidden Unit CVP water contracts. The Corps implements Operations and Maintenance for the reservoirs and Reclamation funds part of the construction cost and annual Operations and Maintenance costs allocated to irrigation. In addition to their interrelated and interdependent relationship to storage, conveyance, and delivery of CVP water supplies under the Buchanan and Hidden Unit CVP water contracts, Corps' operations do integrate with the ecosystem and associated listed species in the San Joaquin Valley. As an example, operations at Eastman Lake have been influenced by the presence of hydrilla (*Hydrilla verticillata*), a nonnative, invasive species that could, if allowed to reach the San Joaquin River and Delta, negatively impact numerous aquatic listed species. Additionally, several listed species exist within or adjacent to both lake project facilities.

Implementation of phases I-III of Operations and Maintenance activities will require tiered section 7 coordination. Incidental take associated with Operations and Maintenance activities on Reclamation, Corps of Engineers, and District lands is not covered by this opinion.

15. Work with the California Department of Pesticide Regulation (CDPR)

a. *To ensure land use activities associated with CVP water will be addressed pursuant to ESA, Reclamation and the Service will work with the California Department of Pesticide Regulation (CDPR) to develop updated guidelines, Reclamation will provide a status report and will provide information to CDPR generated from mapping efforts described in Conservation Measure 1(c) of the Project Description.* [2000 Interim Opinion - Term and Condition - I(A)]

b. Reclamation with assistance from the Service will work with the California Department of Pesticide Regulation to develop guidelines and information addressing the effects of the application of pesticides to listed, proposed, and candidate species. [1995 and 2000 Interim Opinions - 2(a)]

Status: Reclamation has provided information that The South Central California Area Office (SCCAO) and ESRP began working with the State of California Department of Pesticide Regulation (CDPR) in 1993 following implementation of the Friant opinion. By 1995, CDPR had developed a number of slide presentations for use in pesticide applicator training. SCCAO provided some slides to them that are being used as part of the slide presentations and are also in the set of informational cards produced by CDPR and intended for field use. Training by CDPR is provided at seminars for re certification for applicators and licensed pest control advisors. The website for CDPR which has extensive threatened and endangered species information that was developed in cooperation with Reclamation. The SCCAO is still actively

working with CDPR and will be cooperating in the printing of additional cards and also in the development of new ESA information during FY 2001 and beyond.

Reclamation sent a 1-page memo to the Service on April 5, 2000 providing an update on their coordination with the California Department of Pesticide Regulation (CDPR). The memo noted that Reclamation has provided photographs of and information about listed species to CDPR. In addition, the Fifth Annual Status Report on Annual Renewal Contracts received June 5, 2000 provided specific information regarding coordination between Reclamation's SCCAO and CDPR.

Continuing Commitment: Reclamation, working with the Service, will continue to provide information to CDPR generated from Item 5 above as information is generated and that new information will be provided to CDPR for posting on their web site for listed species information.

16. Identify sources of selenium in wetland water supplies and assess selenium effects on aquatic species from agricultural drainage discharged into the San Joaquin River and Delta.

a. *Reclamation will prepare a study plan to identify sources of selenium contamination in the Grasslands, San Joaquin River, and the south Delta estuary.* [1998 Interim Opinion - 3(b), and 2000 Interim Opinion Term and Condition II(A)]

b. *Reclamation will develop and implement a Service approved monitoring program to assess the effects of selenium loading within the San Joaquin River on aquatic listed species or their surrogates.* [2000 Interim Opinion Term and Condition II(B)]

c. *If selenium concentration in refuge water supplies exceeds 2μg/l monthly mean standard for wetland supplies in the Grasslands, and this contamination is a result either directly or indirectly from Reclamations actions, Reclamation will identify and implement corrective actions and initiate separate formal consultation with the Service.* [2000 Interim Opinion Term and Condition II(C)]

Applicability to Consultation: While efforts to address the selenium issues in the San Joaquin Valley and Delta are underway, they are not germane to the renewal of the Buchanan and Hidden Unit CVP water contracts as neither area contributes significantly to the selenium problem in the ecosystem. Drainage problem lands generally do not exist in the Friant Division Contractor service areas or authorized place of use. At one time there were five (5) permitted agricultural drainage evaporation basins within the Alpaugh Irrigation District, a subcontractor to the County of Tulare Cross Valley Canal Contract. These basins were operated by Prose Farms, Inc., Bowman Farms, Inc., Morris and Sons Farms, Steve W. Martin Ranch, Inc., and 4-J Corp. The California Regional Water Quality Control Board-Central Valley Region has approved the final closure report for the Pryse, Bowman, Morris and Martin evaporation basins. It is schedule to consider the 4-J report at its January 2001 meeting. All of

the basins are closed and have not been in operation for several years. No other drainage operations have or do occur in the Friant Division or Cross Valley Canal service areas.

17. Identify, analyze and compensate, if appropriate, for impacts of contract service area changes since 1991 for Friant and 1995 for Interim contractors.

a. *Reclamation will identify and analyze the impacts of changes to contract service area boundaries since 1991 for any Friant contractors. Reclamation will fully compensate for any impacts associated with past changes to contract service area boundaries for the Friant Division.* [2000 Interim Opinion Term and Condition III(A)]

b. *Reclamation will identify and analyze the impacts of changes to contract service area boundaries since 1995 for Interim contractors. Reclamation will fully compensate for any impacts associated with past changes to contract service area boundaries for the Friant Division.* [2000 Interim Opinion Term and Condition III(B)]

c. *For inclusions or annexations involving the Interim and Friant contractors in this opinion that may affect listed species, Reclamation will initiate informal consultation with the Service. For those inclusions with direct or indirect effects that are likely to adversely affect listed species, or result in take, Reclamation will consult formally with the Service. Reclamation, through informal consultation with the Service, will determine if the inclusions or annexations will not affect listed species prior to signing of the FONSI or ROD.* [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition (5) and 2000 Interim Opinion Term and Condition IV(E)]

Status: Reclamation noted in their Quarterly Status Report Tables of July and October 2000 that identification and compensation of impacts related to changes in contract service areas will occur where applicable. Reclamation has records on file that all inclusions and exclusions occurring in the Friant and Interim water contractors service areas between 1991 and 1999 have received informal or formal consultation. Table 2.4 below, and Appendix D identify these areas of inclusion and exclusion within Chowchilla WD and the Madera ID service areas. The Service is unaware of any new inclusions or annexations in these areas since the February 29, 2000 opinion. An ongoing plan to compensate any losses to endangered species habitat that might result from the delivery of CVP water is being developed as described in Item 10.

Continuing Commitment: Reclamation will make a separate determination regarding the affect of these changes in contract service areas to threatened and endangered species and critical habitats pursuant to Section 7 or 10 of the ESA. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these contractor service area changes *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of this determination the Service believes effects related to these service area changes *may affect* federally listed species and/or their *critical habitat*, Reclamation shall initiate formal consultation under Section 7 of the ESA.

Table 2.4 Summary of Pre-CVPIA (1991) service area size and current (2000) service area size for the appropriate Friant Division, Water Service Contractors (Only those districts with boundary changes during the time period are included in table.)				
Water Service District	**No. of Acres Prior to CVPIA**	**Date of Change in Boundary**	**Current No. of Acres**	**Difference**
Chowchilla[2]	82,829.7	5/99	85,619	2,789.3

18. Identify and analyze impacts changes in purpose of use since 1991 for Friant and 1995 for Interim contractors.

a. *Reclamation will identify and analyze the impacts of changes in purpose of use since 1991 for Friant contractors and 1995 for Interim contractors and provide this information and analysis to the Service, specifically analyzing how these changes will affect CVP-wide water supplies under drought conditions.* [2000 Interim Opinion Term and Condition III(C)]

b. *Reclamation will provide the Service with an analysis of how future changes in purpose of use will affect shortages to districts, and how these changes in allocations will affect CVP-wide water supplies under drought conditions.* [2000 Interim Opinion Term and Condition IV(B)]

c. *Reclamation will not execute future changes in purpose of use unless it can be shown that such changes will not reduce under drought conditions (beyond those predicted in the PEIS) water supplies for proposed or listed species.* [2000 Interim Opinion Term and Condition IV(C)]

a. *Reclamation will consult on all future changes in water contracts from Agriculture only to Agriculture/M&I purposes.* [2000 Interim Opinion Term and Condition IV(A)]
Status:

Applicability to Consultation: There are no separate shortage provisions applicable to agricultural supplies for either the Buchanan or Hidden Unit CVP water contracts and no contracts currently exist for M&I supplies.

Continuing Commitment: If changes in water contracts purpose of use (from Agricultural to Agriculture and Municipal and Industrial purposes of use) should be proposed in the future, Reclamation will consult under the ESA.

[1]There were three inclusions in Chowchilla Water Service District: one in 1998 and two in 1999

19. Identify and analyze impacts of all water assignments executed since 1991 for Friant and 1995 for Interim contractors.

a. *Reclamation will identify and analyze the impacts of all water assignments executed since 1991 for Friant contractors and 1995 for Interim contractors and provide this information to the Service. Reclamation will fully compensate for any impacts associated with past water assignments of Interim and Friant Division water allocations.* [2000 Interim Opinion Term and Condition III(D)]

b. *For assignments of Interim or Friant Division water that may affect listed species, Reclamation will initiate informal consultation with the Service. For those contracts or actions with direct or indirect effects that are likely to adversely affect listed species, or result in take, Reclamation will consult formally with the Service. Reclamation, through informal consultation with the Service, will determine if an action will not affect listed species prior to signing of the FONSI or ROD.* [2000 Interim Opinion Term and Condition IV(D)]
Status: In their Quarterly Status Report Table provided to the Service on July 7, 2000 and October 18, 2000, Reclamation noted that information gathering and data analysis for this term and condition is ongoing. Reclamation further noted that information will be provided in BA's for Long-Term Contract Renewal. Reclamation agreed to provide a draft program for compensation by September 2000. The Service has not yet received such a plan for compensation.

As part of the Friant Division and Cross Valley Unit consultation, Reclamation provided the Service with information related to a water assignment from Atwell Island Water District to Hills Valley Irrigation District. In June of 1993 Atwell Island Water District (AIWD), along with Hills Valley Irrigation District, entered into a contract for Cross Valley Canal water (non-CVP water) with the County of Tulare. AIWD acquired an additional 954 acre-feet of CVP surface water supply from Tulare County for a total supply of 2009 acre-feet. In 1996 AIWD sold 2,921 acre-feet of capacity in the Cross Valley canal and permanently assigned 1959 acre-feet of CVP contract supply to Hills Valley for $282 per acre- foot, or around $825,000. Since 1992, there have been no changes in the area of non-irrigated lands in Hills Valley. The 1993 annexation brought in an established citrus orchard. There is no evidence of any conversion of native, uncultivated land in Hills Valley associated with this assignment.

The Service is unaware of any new water assignments that have been executed since the February 29, 2000 Interim opinion.

Continuing Commitment: Reclamation will consult with the Service on future water assignments as they arise.

20. Reclamation will apply applicable criteria to all water transfers

a. Reclamation will apply the following criteria to all transfers and exchanges (from the date of this opinion up to long-term contract renewal) involving Interim or Friant Division contractors that have not already under gone section 7 consultation:

1. Transfers and exchanges will be executed for ***one year only*** *for any district that does not have an established listed-species baseline as described in the draft biological opinion on operations and maintenance of the Central Valley Project (CVP) and implementation of the Central Valley Project Improvement Act of 1992 (CVPIA);*

2. Transferred or exchanged water will be delivered and applied only to areas that were in cultivation from October 15, 1991 (the date of the Friant biological opinion), until one of the following occur and there is no net loss of potential listed-species habitat as a ***direct or indirect*** *result of the transfer:*

a. consultation on the effect of putting the area into cultivation has been completed, or,

b. there is an HCP in place that addresses impacts to the area receiving the water, or,

c. the CVP Conservation Program has a line-item, specific increase in funding to compensate fully for the transfer and is in place prior to the transfer.

3. All other non-historic CVP transfers and exchanges that do not meet the above criteria will require separate section 7 or section 10 authorization. [2000 Interim Opinion Term and Condition IV(F)]

Status: Reclamation has consulted on the following transfers since Interim contract renewal, These transfers were renewed for 1-year until listed species baseline could be established: Exchange Contractors Water Authority, Service File No., 1-1-I-00-1288; and Historic Inter-District CVP Transfers, Service File Nos., 1-1-I-00-1118 and 1-1-00-I-1024.

The effects on delta smelt of transfers involving CVP water delivered through the Delta Mendota Canal or San Luis Canal, wheeled through the CVP or SWP, and totaling up to 250,000 acre-feet annually were addressed in the 1995 OCAP biological opinion.

Continuing Commitment: For Warren Act, water wheeling, Surplus Flood Flow water contracts, and water transfers, Reclamation and the Service will establish a tracking program that assures compliance with the ESA.

The effects of additional transfers (i.e., exceeding a cumulative 250,000 acre-feet annually) on delta smelt, as well as the indirect effects of all transfers on terrestrial species, have not yet been addressed and will undergo consultation as may be required when such transfers are proposed. Because of the high number of transfers that occur annually, the Service and

Reclamation are collaborating on streamlining the consultation process to allow for expedited consultation on water transfers.

21. Develop and implement a Contingency Plan/Adaptive Management Program for implementing compensation commitments associated with losses of listed species habitat as a result of the delivery of CVP water.

a. Reclamation and the Interim and Friant Division contractors will establish a contingency plan that would develop and implement a process to identify impacts and address those impacts to listed species or their habitats within the Interim and Friant Division's contract service area occurring as a result delivering CVP water to the contractors. [2000 Interim Opinion Term and Condition V(A)]

b. *Reclamation will ensure implementation of the contingency plan to address impacts to species or their habitats within the Interim and Friant Division's contract service area that occur without a Service incidental take authorization.* [2000 Interim Opinion Term and Condition IV(B)]

c. *The contingency plan for impacts to listed species or their habitat will be reviewed in a Section 7 consultation with the Service and will incorporate compensation for temporal and other habitat losses. Losses of listed species habitat within the Interim and Friant contract service areas will be compensated at ratios consistent with the recovery needs for those listed species.* [2000 Interim Opinion Term and Condition IV(C)]

Status: This biological opinion addresses a broad range of species and habitat types throughout a large area, and encompasses numerous large-scale, long-term actions. In preparing the Project Description including the conservation measures, all parties have used the best available scientific information and collected input from a broad array of experts. However, it is likely that some aspects of the implemented conservation measures will fail to meet their objectives. Other measures that achieve some success may, nonetheless, not provide the best solutions to the problems addressed. Due to new information, specific objectives and conservation measures may change to provide for species critical needs. Finally, some measures may simply not be implemented as planned, or not implemented at all. The conservation measures above generally ascribe monitoring responsibilities and timelines.

In recognition of the uncertainties inherent in actions included in this Project Description, Reclamation has included provisions for monitoring and applying an adaptive management process. This process ensures that (1) measurable indicators of progress towards achieving all goals will be monitored, and (2) the process and conservation measures can be periodically modified as appropriate to consistently use the best information and most practical means for achieving conservation goals.

Types of Monitoring:

Three type of information will be gathered for monitoring progress and for adaptive management. Information from *compliance monitoring* will provide information on whether actions specified in the Project Description, including conservation measures, are carried out as specified. *Effectiveness monitoring* is designed to determine whether the conservation measures are effective in meeting their goals. These two types of monitoring together will provide overall direction on how effectively the conservation measures are implemented. The third type of information, derived from *species status* monitoring, will be used to help identify critical needs, evaluate progress towards recovery, and in some instances as an indicator of effectiveness.

Adaptive Management:

Information gathered from monitoring will be used to evaluate the effectiveness of actions in meeting specified goals, and adjust specific activities and priorities to provide for successful implementation of all conservation measures. Reclamation will establish and maintain an Adaptive Management Committee (AMC) to perform a variety of functions crucial to the successful implementation of conservation measures included in this and previous applicable biological opinions. The goal of the AMC is to identify, implement or guide implementation, and track the conservation measures. These actions could include the AMC ensuring that scientific advice is provided for funding, research, design, development, construction and implementation of conservation measures and protection arising under this biological opinion, such as Habitat Conservation Plans, Best Management Practices and contingency plans.

Functions of the committee shall include, but are not limited to:

- Track all actions undertaken by Reclamation as part of implementation of the Opinion.
- Seek partners to fund joint efforts to recover species in the San Joaquin Valley.
- Write proposals for funding of research or habitat acquisition from willing sellers.
- Undertake studies of threatened and endangered wildlife, plants and their habitat in the Cross Valley Unit and Friant Division, including areas associated with storage and delivery of water supplies provided by Buchanan and Hidden Unit CVP water service contracts.
- Develop information necessary to evaluate and monitor the effects of implementing Reclamation's water delivery efforts, and develop management practices that will benefit biological resources.
- Design, oversee and have available to the public the scientific studies and data analysis of all monitoring activities required under the biological opinion.
- Oversee the development of monitoring protocols for habitat delineation, land conversion, hazardous material and pesticide use.
- Oversee the results of all monitoring studies and water accounting with the goal of developing information to refine management actions that will benefit listed species.

- Oversee the development of best management agriculture practices, and evaluate projects which enhance, conserve and promote the recovery of listed species on agricultural land.
- Long term project evaluation (25+ years).
- Ensure that scientific information becomes available for use in the design, development, construction and implementation of projects associated with the implementation of the proposed action, including Habitat Conservation Plans, migration corridors, land retirement, water quality (selenium) and others.
- Reclamation shall provide to the AMC, for their evaluation and use, quarterly accounting of water deliveries, transfers, assignments, and water banking, including future actions proposed to Reclamation.

The AMC will consist of one member each from Reclamation, the Service, Friant Division and Cross Valley Unit. The Department of Fish and Game will serve in an ad hoc capacity and technical experts and others will be sought out as appropriate. Reclamation will serve as the chair of the AMC.

The AMC will strive to obtain consensus among members, however, all actions that may affect any listed species or their habitat shall require the approval of the Service. Information acquired from studies, data analysis such as GIS, or from other sources will be used for the following:

- The AMC may determine that some site specific actions may be affecting listed species and may recommend modification to water deliveries, adjust schedules or specify alternate resolutions.
- The AMC may determine that additional information or modification of conservation actions may be needed to avoid adverse effect to a species or to enhance recovery.
- The AMC may seek funding from a variety of sources by submitting a proposal to the CVP Conservation Program or to the CVPIA (b)(1) "Other" program to protect species or habitat with a CVP nexus.

All decisions made by the AMC which could reasonably be expected to affect threatened or endangered species must have FWS concurrence before implementation. The intent is to obtain concurrence from the Service without the need for a lengthy or frequent consultations.

The AMC may have meetings which are open to the public, with notices and agendas provided to all interested parties who request such notices. The public would be encouraged to participate in this forum and shall be afforded the opportunity to comment on agenda items. The AMC shall report the results of monitoring studies and surveys, and seek grants and funds to enhance listed species.

The AMC will meet as often as needed but at least quarterly. Reports of monitoring studies, research, plan accomplishments and overall implementation of the conservation measures will be prepared by the AMC and submitted to the FWS annually.

Any decisions made by the AMC which deviate from measures delineated in the biological opinion, and which may affect listed species, must be approved by the Service before implementation. Service will require 30 working days to review AMC decisions and any supporting data.

Role of AMC in Endangered Species Compliance

Ultimately, the AMC will be the group designed to track implementation of conservation measures and to ensure that elements within this Project Description are implemented as described. In the event that information from monitoring or any other source indicates that any of the project elements necessary for ESA compliance are not being met or will not be met, notification will be provided by the agency which developed the information, to the AMC agencies, as appropriate. Upon notification, the AMC will meet promptly to identify and assess measures which can be taken to remedy any noncompliance or anticipated noncompliance with the conditions, and will immediately implement those measures. If the Service determines that a situation of noncompliance exists and the affected agencies are unable to remedy noncompliance within a reasonable time period that the Service prescribes, not to exceed 90 days, formal consultation will be reinitiated and the Service will issue a new or amended biological opinion with alternative regulatory requirements.

22. Other Conservation Measures

Conservation/Habitat Enhancement Measures

The Districts will notify Reclamation when they plan to develop projects for habitat enhancement on land which receives CVP water. Reclamation has informed the Districts that biologists on staff are available to assist with development of projects. Reclamation biologists can visit districts and attend meetings, if deemed appropriate, to help develop potential enhancement projects as part of Reclamation's commitments for this biological opinion.

Reclamation has committed to enhance habitat values on Federal land, where feasible. To accomplish this goal, Reclamation will work with the Authorities, individual Districts, and with the Service through the Adaptive Management Committee identified in Item 20. Reclamation is currently working on enhancement projects located on Reclamation canals and other Federal property. Participation from the Authorities and Districts is crucial to making this program a success.

Enhancement projects can be located on Federal, District, or private lands, and the cumulative benefits can be substantial over time. Opportunities to work with farmers and develop possible habitat enhancements to their land is very important to conserving listed species.

There is great potential for agricultural lands in the Central Valley to play a substantial role in the recovery of listed species, if wildlife habitat improvements compatible with current

agricultural practices are encouraged. Indeed, full recovery of some listed species is less likely to be possible if agricultural areas are not brought into improved compatibility with wildlife use. Specific wildlife habitat needs include areas for feeding, breeding, travel corridors and shelter, as well as providing benefits to general ecosystem function and stability.

A list of projects will be developed and reviewed by the Adaptive Management Committee. It is anticipated that projects on the list will be sorted according to various stages of development. Some projects will be only conceptual, some will be in beginning stages of implementation, others will be ongoing, and still others may be discarded as unfeasible for various reasons. Types of projects could include, but are not limited to:

- installation of guzzlers on rangeland to benefit bird populations,
- a commitment to delay hay cutting until bird nestlings have hatched, and
- provide escape dens for kit foxes to increase survival, especially in areas with non-native red foxes, coyotes, and feral dogs.

Because each improvement is cumulative, this will be a learning process where new potential projects will be made apparent as others are completed. The Best Management Practices will be updated to include new information as agreements are renewed with parties participating in the program. By working with Districts and individual landowners, it will be possible to learn things that would be difficult to acquire through studies alone.

Applicant-based Conservation Measures

All of the Friant Division, including Chowchilla WD and Madera ID, and Cross Valley Canal Contractors operate conveyance facilities within their boundaries. Many also operate and manage water conservation and groundwater recharge facilities in order to implement their conjunctive use programs. These facilities are critical to efficient use of CVP water. Such facilities could be operated and maintained in a manner that benefits protected species. Managing the use of such facilities for multiple benefits to protected species sometimes may result in take of listed species even though such operation could provide an overall benefit to the species.

The Lower Tule River and Pixley Irrigation Districts are examples of Contractors with significant facilities in areas where substantial benefit could be provided to protected and other species. These Contractors own substantial lands used for groundwater recharge that could be managed in a manner that also benefitted protected and other species. The Contractors have been concerned about managing their lands in a manner providing species benefits because the intended recharge or other uses might be adversely affected by regulation of incidental take of listed species that might use the enhanced lands.

Similarly, many private landowners who receive CVP Federal water through implementation of the proposed contracts and deliveries have lands that they may wish to manage to benefit

natural ecosystems and wildlife. Such conjunctively used lands may not have been managed for wildlife benefits to date because of concerns about liability for incidental take of listed species, either on enhanced lands or nearby areas used for non-wildlife purposes.

In order to encourage conservation actions and programs by the Contractors and private landowners that receive federal water, operation and maintenance plans or other conservation or habitat enhancement projects could be developed, as appropriate. At the Service's discretion, in the future such plans/projects ("conservation projects") can receive incidental take authorization by abbreviated consultation tiered off this biological opinion. Activities likely to have an appreciable net benefit to the listed species will be considered. This will benefit Districts and private landowners wishing to improve natural habitats on their lands, by providing a clear procedure and guidance to obtaining authorization for incidental take that might result despite overall benefits to protected species.

The following describes some of the information needs which will facilitate this process:

- The Service, the Reclamation and the Districts will meet within ninety (90) days of this opinion to begin to develop potential conservation projects;
- Reclamation will provide a map of all Reclamation lands and District lands within the Cross Valley and Friant service areas, including areas associated with storage and delivery of water supplies provided by Buchanan and Hidden Unit CVP water service contracts;
- Districts will coordinate with Reclamation and the Service at least ninety (90) days prior to undertaking conservation projects;
- At that time, the person or District proposing the conservation project will provide a complete description of the current management of the land and the proposed project, the anticipated results, appropriate maps and drawings of the lands/facilities to be beneficially operated and those adjacent lands that may be affected;
- Once the project is implemented, the person or District will cooperate with Reclamation and the Service in monitoring the benefits to protected and other species resulting from the conservation project.

San Joaquin River Restoration Efforts

Some of the original Friant Division Contracts were renewed in 1998. A coalition of environmental organizations led by the Natural Resources Defense Council (NRDC) challenged the adequacy of the environmental documentation supporting such renewals. Additionally, NRDC asserted that the California Fish and Game Code section 5937 is applicable to the operation of Friant Dam. NRDC and the Friant Division Contractors have entered into a stay and stipulation foregoing prosecution of the section 5937 claim for relief for the purpose of implementing a joint San Joaquin River restoration pilot program. The mutual goals and principles guiding this effort state a sincere desire by all parties to develop and implement a permanent river restoration program in settlement of the litigation.

23. Curtail deliveries associated with discovery of conversion of native lands without consideration of ESA

a. *Applicant commitment to restrict delivery to areas converting native lands.*

New Applicant Commitment: Contractors will not deliver CVP Project Water for the purpose of converting any native lands to agricultural or M&I uses unless and until appropriate ESA compliance has determined that such conversion will not likely affect protected species or appropriate mitigation has been provided. The Contractors shall work with the Service and Reclamation to develop a standard definition of native lands for purposes of this consultation by May 1, 2001.

24. Reclamation will amend all long-term contracts to include penalty provisions prohibiting any unauthorized take, conversion of wildland habitat , etc., and provides that Reclamation shall terminate delivery of water to the Contractor until such time as the issue is resolved. [1991 Friant Opinion - Term and Condition (1)]

Status: Term and Condition (1) from the 1991 Friant biological opinion stated the following, "Prior to any final action on the renewal of any long-term water service contracts in the Friant Division, Reclamation shall issue a notice to all Friant contractors within 30 days after issuance of this biological opinion, specifying the prohibitions against take in the Act, and Reclamation requirements on the contractors to conform with provisions of the Act. Further, after the Record of Decision on the environmental impact statement is filed, scheduled for September 1993, all long-term Friant Division contracts that have been renewed with a right to amend (Article 14c) provision shall be amended by Reclamation to include penalty provisions that prohibit any unauthorized take, conversion of widland habitat occupied by listed species, violation of the terms of the contracts pertaining to the conservation of listed species, or irrigation of lands that were not irrigated as of January 1, 1991, which in the opinion of the Service provide(d) habitat suitable for listed species. All such amendments also shall provide (a) that after issuance of the 24-month notices to the contractors specified under #2 below, delivery of Federal water is prohibited to lands supporting habitat suitable for listed species depicted on the maps attached to the 24-month notices unless clearance pursuant to the Endangered Species Act has been obtained from the Fish and Wildlife Service; (b) the Contractor shall terminate immediately and automatically Friant water delivery to the landowner violating this stipulation until such time as Endangered Species Act compliance has been achieved to the satisfaction of Reclamation and the Service; (c) within 3 working days of discovery of the violations, the Contractor shall provide documentation to Reclamation and the Service that termination of water delivery has occurred and will not be reinitiated until Endangered Species Act compliance has occurred to the satisfaction of Reclamation and the Service; and (d) should the Contractor fail to terminate delivery to the landowner, Reclamation shall terminate delivery of water to the Contractor until such time as the issue is resolved to the satisfaction of Reclamation and the Service.

If the Record of Decision is not filed by September 1993, the need to amend the Friant Divisions contracts containing a right to amend provision by this date shall be examined to determine whether the terms and conditions are adequate to minimize the impacts of incidental take. All of the Friant Division long-term contracts that are renewed on or after the date the Record of Decision on the environmental impact statement is filed shall include the same provisions that are required by the preceding paragraph to be included in the renewed contracts which contain the right to amend."

Applicability to Consultation: This language is no longer applicable to this long-term renewal process.

25. Reclamation shall consult with the Service on any deliveries of water using Friant facilities beyond that addressed in this biological opinion. [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition (5)]

Continuing Commitment: If deliveries of water using Friant Division facilities are proposed to occur beyond that addressed in this opinion, Reclamation will consult appropriately.

Additional Commitments Associated with Long-term Renewal of CVP Water Service Contracts

The following programmatic level commitments are from the consultation on the *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*, dated November 23, 2000. While most of the commitments in section VI of that opinion relate to the action of CVP contract renewal, the following more specifically apply to this proposed action.

1. Long-term contracts will be renewed, and Reclamation will complete tiered site specific consultations with the Service. No CVP water will be delivered or applied outside current contract service areas until either formal or informal consultation, as appropriate, is complete. Once formal site specific consultation has occurred that is in compliance with this opinion, it is assumed that changes in land-use practices, and impacts to listed and proposed species, in the districts have been addressed.

4. Reclamation and the Service will write a joint letter to the water districts, any member agencies, Planning Departments of cities or counties within the districts using CVP water, and other responsible parties regarding requirements under the ESA. The letter will include: (1) a discussion of Reclamation's need to ensure that CVP water is not used in a manner which could jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated *critical habitat*, and (2) an explanation of the prohibitions described under Section 9 of the ESA in regard to *take*. The letter will discuss the appropriate protection measures as described here and in subsequent contract renewal consultation and will be completed within 60 days of execution of long-term contracts.

5. Conservation strategies will be in place for the districts or areas receiving CVP water. The types of strategies that could be accepted are: *Habitat Conservation Planning* as described in section 10(a) of the ESA; programmatic land management actions that include protection of listed and proposed species; requirements resulting from site specific Section 7 consultation; or an expansion of the existing CVP Conservation Program that adequately compensates for the direct and indirect effects of increased water delivery to an area.

6. Reclamation will, subsequent to a determination of *may affect* to listed species and/or adverse modification to designated *critical habitat* in consultation with the Service's SFWO Endangered Species Division, consult on all Federal actions that result in changes in purpose of use for CVP water contracts, including changes from Agriculture to Agriculture/Municipal and Industrial purposes.

7. The Service and Reclamation will work together to convey information to the water districts, and individual water users (as appropriate), on listed species needs. Reclamation will establish an outreach and education program, in collaboration with the Service, to help water users integrate implementation of the CVPIA and requirements of the contract renewal process as it relates to the ESA.

8. Interior will work closely with the water users, providing them maps of listed species habitats within their service-areas and guiding them through the consultation process to address site specific effects. Reclamation may encourage CVP contractors to complete HCPs encompassing the affected areas.

9. Reclamation and/or the Service will develop provisions for compensation for the loss of endangered species habitat resulting from the direct or indirect effects of a Reclamation action not covered under prior biological opinions that occur within the CVP service areas from the date of this opinion until completion of either: (a) contract area specific Section 7 consultation, (b) any other required site specific Section 7 consultation on the effects of the conversion in question, or (c) the completion of an HCP that encompasses the area in question.

10. Reclamation and CVP contractors will comply with all applicable opinions related to the CVP (listed in the Introduction to this opinion). Flow standards that form the environmental baseline of the 1995 OCAP biological opinion will be met, and Reclamation will take no discretionary actions (e.g. new contracts, contract amendments, facility construction) that would incrementally increase diversions and alter hydrologic and environmental conditions in the Delta until any required consultation is reinitiated and completed.

12. Reclamation, relative to all new and renewed water service contracts will informally consult with the Service's SFWO Endangered Species Division to determine the need for formal consultation prior to contract execution.

13. Reclamation will make certain that applicable measures to ensure ESA compliance for the renewal of CVP water service contracts are provided within the text of new and/or amended long-term water contracts and related actions.

14. Reclamation will provide information related to proposed new water assignments of Project water to the Service's SFWO Endangered Species Division prior to execution of the assignment.

Further Key Assumptions Relative to this Project Description

If this Project Description is not implemented as prescribed herein, or new information becomes available, consultation would be reinitiated to ascertain how the lack of implementation of any actions, or new information, affects the analyses and findings in this document. The following key assumptions and actions are considered relevant to this biological opinion and part of the Project Description and are therefore requisite in conducting the effects analysis and findings:

1. All conservation measures described in this Project Description will be implemented in the manner and schedule described. Reclamation, the Service, and the contractors, as applicable, will obtain sufficient funding to carry out their responsibilities in implementing these conservation measures.

2. Reclamation will implement the Project Description in a manner consistent with implementation of any listed species recovery plans, including the 1998 Recovery Plan for Upland Species of the San Joaquin Valley.

3. Interior will ensure full implementation of commitments and conservation actions described in the Preferred Alternative for Implementing the CVPIA, including:

- actions and programs as identified in the Proposed Alternative for implementing the CVPIA, including but not limited to: long term contract renewal, management of the CVP in a manner consistent with Interior's *Decision on Implementation of Section 3406(b)(2) of the Central Valley Project Improvement Act*, released on October 5, 1999; implementation of the (b)(1)"other" program; implementation of the Anadromous Fish Restoration Program; and provision of a firm water supplies to Central Valley wildlife refuges and wetland areas.
- activities, programs, and processes included in commitments for the 2000 biological opinion on *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*, section 2, VI. Reclamation and Service Commitments for New and Continuing Actions.

4. Reclamation and the Service will comply with all biological opinions related to the CVP, including but not limited to;

- flow standards that form the environmental baseline of the 1995 OCAP and Los Vaqueros biological opinions

- discharges into surface water bodies by CVP contractors resulting from CVP water impoundments and diversions will comply with the standards set in the biological opinion on the California Toxics Rule (number 1-1-98-F-21) in accordance with applicable implementation plans.

- commitments and conservation measures found in the biological opinion for the CALFED Bay-Delta Program (1-1-F-00-183)

- commitments and conservation measures found in the biological opinion on *Implementation of CVPIA and Continued Operations and Maintenance* of CVP (1-1-F-98-0124)

5. Reclamation will not implement additional discretionary actions (e.g., new contracts, contract amendments, facility construction) that would incrementally increase diversions and alter hydrologic and environmental conditions in the Delta beyond that considered in the existing OCAP until consultation on OCAP is reinitiated and completed.

6. Other CVP-related, non-CVPIA actions benefitting fish, wildlife, and associated habitats will continue, with at least current funding levels, including:

- implementation of the Central Valley Project Conservation Program
- implementation of the CVPIA (b)(1) "other" Program
- implementation of the Wetland Development Program
- implementation of the Comprehensive Mapping Program
- implementation of the Land Use Monitoring and Reporting Program
- continued Interagency Coordination for Ecosystem Protection

7. Water will continue to be delivered to CVP service contractors in quantities that approximate amounts provided in this project description. Reclamation and the Service will coordinate, for ecosystem-level planning purposes relative to water deliveries to CVP contractors. Reclamation will provide information to the Service on annual deliveries each year, prior to or concurrent with informing the water districts of their allocation amounts. However, it is understood biological opinions for OCAP (1-1-94-F-70) and Los Vaqueros (1-1-95-F-117 and 1-1-95-F-134) are in place, and at no time can the total amount of these CVP deliveries exceed the total consolidated amount considered in these opinions. Further, individual tier water contract renewal processes will further address issues related to specific contract quantities as a part of their consultations under Section 7 the ESA. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these CVP deliveries *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of annual delivery information provided by Reclamation (#2 above), the Service believes effects related to these CVP deliveries *may affect* federally listed species and/or their *critical habitat*, the Service will request Reclamation to initiate formal consultation under Section 7 of the ESA.

3. Status of Species and Environmental Baseline

Species Account

An abbreviated summary of species and baseline information is included in these accounts. For more detailed information on the biology and life history of these species, see the respective recovery plans for the individual species as referenced in the Literature Cited, Section 9. For a habitat-based baseline for the impacted area, see the Service's Biological Opinion on Operations of the CVP and Implementation of the CVPIA (Service file # 1-1-98-F-0124).

Aleutian Canada Goose *(Branta canadensis **spp.** leucopareia)*

Species Description and Life History: The Aleutian Canada goose was listed as endangered in 1967, and was downgraded to threatened on December 12, 1990 (55 **FR** 51106). Canada geese (*Branta canadensis*) have brownish grey bodies, darker wings, and black necks and heads with a distinctive white "chin strap." They range in length from about 22-45 inches. The Aleutian subspecies can be distinguished from most other subspecies by its small size (only Cackling Canada Geese are smaller) and a ring of white feathers at the base of black neck feathers in birds older than 8 months (Service 1991).

Historic and Current Distribution: Historically, the Aleutian Canada Goose was known to nest on most of the larger islands in the Aleutian Islands and in the Commander and northern Kuril Island chains. When the species was first listed as endangered in 1967, its only known nesting site was Buldir Island in the western Aleutian Islands, Alaska. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians, and Kaliktagik Island in the Semidi Islands.

In California, the Aleutian Canada Goose spends the winter on agricultural lands along the north coast, and throughout the Sacramento and San Joaquin Valleys. Major migration and wintering areas include agricultural lands north of Crescent City in Del Norte County, around the Sutter Buttes in the Sacramento Valley, near El Sobrante in Contra Costa County, and along the San Joaquin River between Modesto and Los Banos.

Reasons for Decline and Threats to Survival: The decline of this subspecies is largely attributed to predation resulting from the introduction of foxes and other small mammals to the Aleutian Islands during the period 1836 to 1930. At one time, recreational and subsistence take of this subspecies in the Pacific Flyway may have been a significant factor preventing the remnant breeding segments from recovering. The actual wintering areas were not known until the recovery of the first banded birds was reported in late 1974 in California. The wintering habitat has been the focus of study from 1974 to present. Areas in California and Oregon, essential to winter survival, have been identified and partially protected by inclusion of these lands in the National Wildlife Refuge System or California's Resource Agency Wildlife Area and State Park

systems. Additionally, major staging and migration areas, and additional wintering areas, including areas in California, have been closed to the hunting of this and/or other subspecies of Canada Goose, offering further protection.

Changing land use practices in California, including the conversion of cropland and pastures to housing and other urban development, adversely affect Aleutian geese (Service 1991). The lack of adequately protected migration and winter habitat for Aleutian geese is the greatest obstacle to full recovery of this species (Service 1991).

Bald Eagle *(Haliaeetus leucocephalus)*

Species Description and Life History: The bald eagle was listed as endangered in 1967 under the predecessor to the Endangered Species Act of 1973, as amended (Act). It was downlisted from endangered to threatened status on July 12, 1995 (60 **FR** 36010), and was proposed for delisting on July 6, 1999 (64 **FR** 36454). The bald eagle is a large raptor, a member of the family Accipitridae. The characteristic adult plumage consists of a white head and tail with a dark brown body. Juvenile eagles are completely dark brown and do not fully develop the white head and tail until the fifth or sixth year. Fish are the primary food source but bald eagles will also take a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available. Adults average about 3 feet from head to tail, weigh approximately 10 to 12 pounds and have a wingspread that can reach 7 feet. Generally, females are larger than the males.

Breeding pairs of bald eagles mate for life. The breeding season varies throughout the U.S., but typically begins in the winter for the southern populations and progressively shifts toward spring the further north the populations occur. The typical nest is constructed of large sticks and lined with soft materials such as pine needles and grasses. One to three eggs are laid in nests that are built in tall trees and measure up to 6 feet across and weighing hundreds of pounds. Nests are used by the same pair of eagles year after year, with alternate nests being built in the general area. The eggs are incubated about 35 days. The young fledge 9 to 14 weeks after hatching and at approximately 4 months the young eaglets are on their own.

Historic and Current Distribution: Bald eagles occur virtually anywhere in California during migration. They nest near water bodies in the northern portion of the state and winter throughout the state wherever suitable prey resources are available.

Reasons for Decline and Threats to Survival: After World War II, the use of DDT to control mosquitos became widespread along coastal and wetland areas. Bald eagles and many other birds of prey and piscivorous birds declined drastically. It was later determined that DDE, a breakdown product of DDT, was causing thin-shelled eggs, causing reproductive failure. The decline continued until DDT was banned from use in the United States on December 31, 1972. The number of breeding pairs in California has increased from 50 in 1981 to nearly 100 in the early 1990's. The current increases in populations throughout the range in the lower 48 states are due primarily to the banning of DDT and protection of nesting sites.

Blunt-nosed Leopard Lizard (*Gambelia sila*)

Species Description and Life History: The blunt-nosed leopard lizard was listed as endangered on March 11, 1967 (32 **FR** 4001). It was subsequently listed as endangered by the State of California in 1971. The species is included in the Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998).

The blunt-nosed leopard lizard is a relatively large lizard of the family Iguanidae and is endemic to the San Joaquin Valley, inhabiting open, sparsely vegetated areas of low relief on the Valley floor and the surrounding foothills. Blunt-nosed leopard lizards feed primarily on insects, lizards, and occasionally plant material.

Breeding activity begins within a month of emergence from dormancy and lasts from the end of April to the end of June. Males are highly combative in establishing and maintaining territories. Male and female home ranges often overlap. The mean home range size varies from 0.25 to 2.7 acres for females and 0.52 to 4.2 acres for males. Two to six eggs are laid in June and July, and their numbers are correlated with the size of the female. Under adverse conditions, egg-laying may be delayed 1 or 2 months or reproduction may not occur at all. Females typically produce only one clutch of eggs per year, but some may produce three or more under favorable environmental conditions. After about 2 months of incubation, young hatch from late July through early August, rarely to September.

Leopard lizards use small rodent burrows for shelter from predators and temperature extremes. Burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels. Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. In areas of low mammal burrow density, lizards will construct shallow, simple tunnels in earth berms or under rocks. Potential predators are numerous and include snakes, predatory birds, and most carnivorous valley mammals.

Lizards are active on the surface when air temperatures are between 73 and 104°F and surface soil temperatures are 71 and 122°F. Optimal activity occurs when ground temperatures are between 71 and 97°F or slightly higher. Smaller lizards and young have a wider activity range than the adults.

Historic and Current Distribution: Although the boundaries of its original distribution are uncertain, blunt-nosed leopard lizards probably occurred in the San Joaquin Valley from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south, and from the Coast Range mountains, Carrizo Plain and Cuyama Valley in the west to the foothills of the Sierra Nevada in the east. In general, leopard lizards are absent from areas of steep slope, dense vegetation, or areas subject to seasonal flooding.

The currently occupied range consists of scattered parcels of undeveloped land on the Valley floor, most commonly annual grassland and valley sink scrub. The lizards also inhabit alkali

playa and valley saltbush scrub. In the southern San Joaquin Valley, extant populations are known to occur on the Kern and Pixley National Wildlife Refuges, Liberty Farms, Allensworth, Antelope, the Carrizo and Elkhorn plains, the Buttonwillow, Elk Hills and Tupman Essential Habitat Areas, north of Bakersfield around Poso Creek, and in western Kern County around the towns of Maricopa, McKittrick and Taft.

Reasons for Decline and Threats to Survival: The primary cause of population decline for the blunt-nosed leopard lizard is the conversion of habitat to agriculture. Since the 1870's, more than 95 percent of the lizard's natural habitat have been destroyed. Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization. Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. However, light or moderate grazing may be beneficial.

Pesticides, rodenticides, and other chemical may directed and indirectly impact leopard lizards. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned.

California Red-legged Frog (*Rana aurora draytonii*)

Species Description and Life History: The California red-legged frog was listed as threatened on May 23, 1996. Critical habitat was the species was proposed on September 11, 2000 (65 **FR** 1018), and a draft Recovery Plan was issued in 2000 (Service 2000). The California red-legged frog is the largest native frog in the western United States, ranging from 1.5 to 5 inches in length. The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers. Dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3 inches in length, and the background color of the body is dark brown and yellow with darker spots.

Historical and Current Distribution: The California red-legged frog is now found primarily in wetlands and streams in coastal drainages of central California, and in the Sierra Nevada foothills. Red-legged frogs are known to occur in about 240 streams or drainages from 24 counties, primarily in central coastal California, and the foothill regions of the western Sierra Nevada. Only three areas within the entire historic range of the subspecies may currently support more than 350 adults.

Reasons for Decline and Threats to Survival: The California red-legged frog has sustained a 75 percent reduction in its geographic range in California as a result of several factors acting singly or in combination. Habitat loss and alteration, combined with over exploitation and introduction of exotic predators, were significant factors in the red-legged frogs' decline in the early to mid-1900s.

The California red-legged frog is threatened within its remaining range by a wide variety of human impacts, including urban encroachment, construction of reservoirs and water diversions, land conversions, industrial and non-industrial forest practices, introduction of exotic predators and competitors, livestock grazing, and habitat fragmentation. It is estimated that California red-legged frogs were extirpated from the Central Valley floor before 1960.

Remaining aggregations (assemblages of one or more individuals, not necessarily a viable population) of California red-legged frogs in the Sierran foothills became fragmented and have been nearly extirpated by reservoir construction, continued expansion of exotic predators, grazing, and prolonged drought. Within the Central Valley hydrographic basin, only 14 drainages on the Coast Ranges slope of the San Joaquin Valley and three drainages in the Sierran foothills are actually known to support or may support California red-legged frogs, compared to over 60 historic locality records for these basins.

California Tiger Salamander *(Ambystoma californiense)*

Species Description and Life History: The California tiger salamander is a candidate species for Federal listing as threatened; the population in Santa Barbara is already listed as endangered. The California tiger salamander is restricted to grasslands and low (under 1500 foot) foothill regions where lowland aquatic sites are available for breeding. The larvae require significantly more time to transform into juvenile adults than other amphibians such as the western spadefoot toad (*Scaphiopus hammondii)* and Pacific tree frog *(Pseudacris regilla)*, and prefer natural ephemeral pools, or ponds that mimic ephemeral pools (stock ponds that go dry). These requirements restrict California tiger salamanders to large vernal pools, vernal playas and large sag ponds. Compared to the western toad (*Bufo boreas)* or western spadefoot toad, California tiger salamanders are poor burrowers, and so require refugia provided by ground squirrels and other burrowing mammals in which to estivate during the dry months.

A typical salamander breeding population in a pond can fluctuate through stochastic processes to less than twenty individual breeding adults and/or recruiting juveniles in some years, making these local populations prone to extinction. California tiger salamanders therefore require large contiguous areas of vernal pools (vernal pool complexes or comparable aquatic breeding habitat) containing multiple breeding ponds to ensure that recolonization occurs at individual pond sites.

Current and Historic Distribution: The range of California tiger salamander is restricted to California. The species persists in disjunct remnant vernal pool complexes in Sonoma and Santa Barbara counties, in vernal pool complexes and isolated ponds scattered along a narrow strip of rangeland on the fringes of the Central Valley from southern Colusa County south to northern Kern County, and in sag ponds and human-maintained stock ponds in the coast ranges from the San Francisco Bay area south to the Temblor Range. The California tiger salamander has been eliminated from an estimated 55 to 58 percent of its historic breeding sites and has lost an estimated 75 percent of its habitat. California tiger salamanders are presently protected only at Jepson Prairie

Natural Preserve and Hickson Preserve. There are approximately 150 known local populations of California tiger salamanders.

Reason for Decline and Threats to Survival: The primary cause of the decline of California tiger salamander populations is the loss and fragmentation of habitat from human activities and the encroachment of nonnative predators. Federal, State and local laws have not prevented past and ongoing losses of California tiger salamander habitat. All of the estimated seven genetic populations of this species have been significantly reduced because of urban and agricultural development, land conversion, and other human-caused factors.

A strong negative association between bullfrogs and California tiger salamanders has been documented. Although bullfrogs are unable to establish permanent breeding populations in vernal pools, dispersing immature frogs from permanent water bodies within two miles take up residence and prey on adult or larval salamanders in these areas during the rainy season. Louisiana swamp crayfish, mosquito fish, green sunfish and other introduced fishes also prey on adult or larval salamanders. A deformity-causing infection, possibly caused by a parasite in the presence of other factors, has affected pond-breeding amphibians in California at known California tiger salamander breeding sites. This infection has become widespread among amphibian populations in Minnesota and poses a threat of becoming widespread in California. Tiger salamanders have been known to be locally extirpated from disease at stock tanks in Arizona.

Reduction of ground squirrel populations to low levels through widespread rodent control programs may reduce availability of burrows and adversely affect the California tiger salamander. Poison typically used on ground squirrels is likely to have a disproportionately adverse effect on California tiger salamanders, which are smaller and have permeable skins. Use of pesticides, such as methoprene, in mosquito abatement may have an indirect adverse effect on the California tiger salamander by reducing the availability of prey. Various nonnative subspecies of the tiger salamander within the *Ambystoma tigrinum* complex have been imported into California for use as fish bait. The introduced salamanders may out-compete the California tiger salamanders, or interbreed with the natives to create hybrids that may be less adapted to the California climate or are not reproductively viable past the first or second generations. Automobiles and off-road vehicles kill a significant number of migrating California tiger salamanders, and contaminated runoff from roads, highways, and agriculture may adversely affect the California tiger salamander.

Colusa Grass *(Neostapfia colusana)*

Species Description and Life History: Colusa grass was listed as threatened on March 26, 1997 (62 **FR** 14338). It is a robust, tufted annual in the grass family (Poaceae) that grows 3-12 inches tall. The lower portions of the stems lie on the ground; the upper portions are erect and terminate in dense cylindrical, spike-like inflorescences that superficially resemble small ears of corn. The inflorescence and overall appearance of the plant are unique, so this species is not easily confused with any other. Its closest relatives are the Orcutt grasses. Colusa grass is the only extant species

in the genus *Neostapfia*. Colusa grass occurs in large or deep vernal pools with substrates of adobe mud (Stone *et al.* 1988).

Historic and Current Distribution: Colusa grass is restricted to the Sacramento and San Joaquin Valleys. Converting habitat to agricultural use has eliminated the type locality in Colusa County and at least 7 populations have been eliminated in Merced and Stanislaus Counties. Approximately 44 populations remain along a 100-mile stretch of the eastern San Joaquin Valley in Merced and Stanislaus Counties; 4 populations exist in Yolo and Solano Counties. All populations exist on private lands, with the exception of one found on Castle Air Force Base in Merced County and one on McClellan Air Force Base in Yolo County.

Reasons for Decline and Threats to Survival: Most of the remaining populations continue to be variously threatened by agricultural land conversion, herbicide contaminated runoff, and competition from introduced weedy species that tend to displace Colusa grass. Two populations are currently protected at the Nature Conservancy's Jepson Prairie Preserve in Solano County and at the Flying M Ranch in Merced County, where conservation easements protect some of the large vernal pools.

Conservancy Fairy Shrimp *(Branchinecta conservatio)*

Species Description and Life History: The Conservancy fairy shrimp was listed as endangered on September 19, 1994 (59 **FR** 48136). It is an aquatic crustacean belong to the order Anostraca. It has delicate elongate bodies, large stalked compound eyes, no carapaces, and 11 pairs of swimming legs. It glides gracefully upside down, swimming by beating their legs in a complex, wavelike movement that passes from front to back. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The resting or "summer" eggs are known as "cysts." They are capable of withstanding heat, cold and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. The cysts hatch when the pools fill with rainwater. The early stages of the fairy shrimp develop rapidly into adults. These non-dormant populations often disappear early in the season long before the vernal pools dry up.

Conservancy fairy shrimp inhabit vernal pools that are large with highly turbid water. They have been collected from early November to early April.

Historic and Current Distribution: The Conservancy fairy shrimp is known from six disjunct populations: Vina Plains, north of Chico, Tehama County; south of Chico, Butte County; Jepson Prairie, Solano County; Sacramento National Wildlife Refuge, Glenn County; near Haystack Mountain northeast of Merced in Merced County; and the Lockewood Valley of northern Ventura County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to primarily agricultural and urban uses. This highly disturbed remnant habitat is not protected and the existing populations of the vernal pool fairy shrimp and vernal pool tadpole shrimp are imperiled by a variety of human-caused activities, primarily urban development, water supply/flood control projects and conversion of land to agricultural use.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, the endemic habitat of the vernal pool fairy shrimp, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

The habitat of the listed vernal pool crustaceans is highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. This fragmentation results in small isolated fairy shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987*a*,*b*). Should extinction occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to geographical isolation from other populations.

Delta Smelt *(Hypomesus transpacificus)*

Species Description and Life History: The delta smelt was listed as threatened on March 5, 1993 (58 **FR** 12863). Critical habitat is designated as areas of all water and all submerged lands below ordinary high water and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained within the Delta, as defined in Section 12220 of the California Water Code (50 **CFR** Section 17.95). The delta smelt is included in the Recovery Plan for Sacramento/San Joaquin Delta Native Fishes (Service 1996).

Delta smelt are a slender-bodied fish with a steely blue sheen on the sides and seem almost translucent. The delta smelt, which has a lifespan of one year, has an average length of about 2 to 3 inches.

The delta smelt is an euryhaline species (tolerant of a wide salinity range) that spawns in fresh water and has been collected from estuarine waters up to 14 ppt (parts per thousand) salinity . For a large part of its annual life span, this species is associated with the freshwater edge of the mixing zone (saltwater-freshwater interface), where the salinity is approximately 2 ppt.

Shortly before spawning, adult delta smelt migrate upstream from the brackish-water habitat associated with the mixing zone to disperse widely into river channels and tidally-influenced backwater sloughs. Delta smelt spawn in shallow, fresh, or slightly brackish water upstream of the mixing zone. Most spawning occurs in tidally-influenced backwater sloughs and channel edgewaters. Although delta smelt spawning behavior has not been observed in the wild, the adhesive, demersal eggs are thought to attach to substrates such as cattails, tules, tree roots, and submerged branches.

Historic and Current Distribution: Delta smelt are endemic to the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties, California. The delta smelt is thought to have occurred historically from Suisun Bay upstream to at least the city of Sacramento on the Sacramento River and Mossdale on the San Joaquin River.

Delta smelt were once one of the most common pelagic (living in open water away from the bottom) fish in the upper Sacramento-San Joaquin estuary, as indicated by its abundance in CDFG trawl catches. The actual size of the delta smelt population is not known. Stevens *et al.* estimated the population size to be about 280,000, but they recognized that this value is based on a tenuous relationship between delta smelt numbers and numbers of young striped bass, and is imperfect. However, the pelagic life style of delta smelt, short life span, spawning habits, and relatively low fecundity indicate that a fairly substantial population probably is necessary to keep the species from becoming extinct.

Reasons for Decline and Threats to Survival: The cause of decline of delta smelt are numerous, and include diversion of water from the Sacramento and San Joaquin Rivers for agricultural and development purposes, entrapment of young fish in water diversion systems, decrease in native copepod prey numbers, pesticide and other chemical effects, and potential hybridization with introduced Japanese pond smelt. Because delta smelt are a one-year species, the impacts of the above anthropogenic factors are magnified. These factor continue to threaten the survival and recovery of the species.

Fleshy Owl's-Clover *(Castilleja campestris ssp. succulenta)*

Species Description and Life History: The fleshy owl's-clover was listed as threatened on March 26,1997 (62 **FR** 14338). Fleshy owl's-clover is an annual herb in the snapdragon family (Scrophulariaceae). Its stems are erect, generally 2-10 inches tall, and may be branched or unbranched. The leaves are succulent and brittle. Bright yellow to white flowers appear in May, clustered near the ends of branches and surrounded by leafy bracts. Like other members of *Castilleja* and related genera, it is hemiparasitic (partly parasitic) on the roots of other plants. It occurs on the margins of vernal pools, swales and some seasonal wetlands, often on acidic soils. It is never dominant and it is found in only a few of the pools in an area (Skinner and Pavlik 1994). The species' range overlaps that of the related *Castilleja campestris* ssp. *campestris* in Stanislaus County, but the latter can be distinguished by its usually more brittle leaves, shorter bracts, larger corollas and longer stigma.

Historical and Current Distribution: Fleshy owl's-clover is endemic to the rolling lower foothills and valleys along a 66-mile stretch of the eastern San Joaquin Valley. Its historical range was presumably somewhat greater than its current range. It is currently known from 36 sites in eastern Merced, southeastern Stanislaus, Madera, San Joaquin and northern Fresno Counties.

Reasons for Decline and Threats to Survival: Nearly one-half of the currently known populations of fleshy owl's-clover are variously threatened by loss and degradation of habitat resulting from urban development, agricultural land conversion, discing, flood control projects, overgrazing and a highway expansion project. Twenty-two populations occur on private lands without protection for the species. Discing appears to have eliminated at least one population in Fresno County. Seven populations are protected at the Flying M Ranch in Merced County, where The Nature Conservancy (TNC) has a conservation easement. Two other populations occur on lands managed by the U.S. Bureau of Reclamation and the U.S. Bureau of Land Management.

Fresno Kangaroo Rat *(Dipodomys nitratoides exilis)*

Species Description and Life History: The Fresno kangaroo rat was listed as endangered in 1985 (50 **FR** 4226). 857 acres of critical habitat has been designated in Fresno County (50 **CFR** 17.95a). Twenty-three acres are in a small part of the Mendota Wildlife Management Area, 732 acres comprise the contiguous Alkali Sink Ecological Reserve, both State-owned and managed, and 102 acres are in five privately-owned parcels. Recovery of the Fresno kangaroo rat is discussed in the Upland Recovery Plan (Service 1998).

The Fresno kangaroo rat is one of three subspecies of San Joaquin kangaroo rats. Although there is a slight size difference among the subspecies, with the Fresno being the smallest, the subspecies cannot be distinguished reliably except through genetic analysis. Like the other 20 species of kangaroo rats, the San Joaquin kangaroo rat have physiological adaptations to bipedal hopping that include elongated hind limbs, a long, tufted tail for balance, a shortened neck and a large, flattened head. Other characteristics include large, dorsally placed eyes and small, rounded ears. Fore-limbs are comparatively short with stout claws that facilitate digging burrows. The fur is dark yellowish-buff dorsally and white ventrally. A white stripe extends across the hips, continuing for the length of the tufted tail. The base of the tail is circumscribed by white. Dorsal and ventral sides of the tail are blackish. Dark whisker patches on each side of the nose are connected by a black band of fur. San Joaquin kangaroo rats can be distinguished from other kangaroo rats within their range by the presence of four toes on the hind foot; other species have five toes.

Fresno kangaroo rats eat mostly seeds, with small amounts of green, herbaceous vegetation and insects supplementing their diet when available. Most kangaroo rats gather seeds when they are available and cache them for consumption later. Typically, caches are made in small pits that hold the contents of the two cheek pouches. Caches are located on the surface of the soil, and are typically scattered over the home range of the individual. Fresno kangaroo rats may not cache seeds in their burrows to the same extent as other kangaroo rats. The soil where they live is damp

much of the year, and seeds would spoil rapidly under such conditions. Therefore, Fresno kangaroo rats may be obligated to forage on the surface year round.

Historic and Current Distribution: The historic range of the Fresno kangaroo rat encompassed an area of grassland and chenopod scrub communities on the San Joaquin Valley floor, from about the Merced River, Merced County, on the north, to the northern edge of the marshes surrounding Tulare Lake, Kings County, on the south, and extending from the edge of the Valley floor near Livingston, Madera, Fresno, and Selma, westward to the wetlands of Fresno Slough and the San Joaquin River. Documentation of historical distribution is scanty. An estimate of the historical range, within the area as outlined above, is about 888,459 acres. As Fresno kangaroo rats prefer nearly level, light friable soils, not all of this area would have been habitat.

There are no known populations within the circumscribed historical geographic range in Merced, Madera, and Fresno Counties. In Kings County, two populations of San Joaquin kangaroo rats have been found on about 371 acres in 1994 and 1995. One site, Lemoore Naval Air Station, is 97 acres. Whether these populations belong to the Fresno or Tipton subspecies is uncertain, but historically, their ranges were contiguous. Genetic research is ongoing to identify these populations to subspecies.

Reasons for Decline and Threats to Survival: Loss of habitat to cultivation, year-round grazing and conversion of land to other uses, coupled with the resulting fragmentation and isolation of populations increase the probability of extinction from demographic and genetic stochasticity. Flooding due to levee failure also poses a high risk because of the proximity to the San Joaquin River. Other potential threats are the indiscriminate use of rodenticides, competition with Heermann's kangaroo rats, and disease and predation, any of which could extirpate small, isolated populations.

Giant Garter Snake *(Thamnophis gigas)*

Species Description and Life History: The giant garter snake was listed as threatened on October 20, 1993 (58 **FR** 54053). No critical habitat has been designated. A draft recovery plan for the giant garter snake was released in 1999 (Service 1999).

The giant garter snake is one of the largest garter snakes, reaching a total length of at least 63 inches. Females tend to be slightly longer and proportionately heavier than males. Female giant garter snakes typically weigh 1-1.5 pounds. Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light colored lateral stripes. Background coloration and prominence of a black checkered pattern and the three light stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Giant garter snakes feed primarily on small fishes, tadpoles, and frogs. Habitat requisites consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.

The giant garter snake inhabits small mammal burrows and other soil crevices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). Giant garter snakes typically select burrows with sunny exposure along south and west facing slopes. The breeding season extends through March and April, and females give birth to live young from late July through early September. Brood size is variable, ranging from 10 to 46 young, with a mean of 23. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size within the first year. Sexual maturity averages three years for males and five years for females.

Historic and Current Distribution: Although the boundaries of its original distribution is uncertain, Fitch (1941) described the historical range of the giant garter snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. The Service currently recognize 13 separate distinct populations of the giant garter snake: (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/ Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh, (10) East Stockton– Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare.

Reasons for Decline and Threats to Survival: Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range. The survival of giant garter snake populations are currently threatened by selenium contamination, introduction of predatory game fish and bullfrogs, loss and alteration of habitat associated with agriculture and urban development, and road kills. The isolation of the 13 extant populations from each other without protected dispersal corridors make the species vulnerable to extirpation by random, naturally occurring environmental events, population dynamics and genetic processes.

Greene's Tuctoria *(Tuctoria greenei)*

Species Description and Life History: Greene's tuctoria is a small, tufted annual in the grass family (Poaceae). The plant has several to many stems 2-6 inches tall, each ending in a spike-like inflorescence that may be partly enfolded in the upper leaf. The genus *Tuctoria* is distinguished from other Orcutt grasses (in the genus *Orcuttia*) by the spiral arrangement of the spikelets (flowers) and other characteristics of its flower parts (Stone *et al.* 1988; 58 **FR** 14338). Greene's tuctoria occurs in small or shallow vernal pools or the early drying sections of large, deep vernal pools (Stone *et al.* 1988).

Historic and Current Distribution: Greene's tuctoria is restricted to vernal pools in the Central Valley. Its historical range included parts of Shasta, Tehama and Butte Counties in the northern Sacramento Valley, and extended from San Joaquin County to Tulare County in the San Joaquin Valley. The taxon no longer occurs in Fresno, Madera and Tulare Counties. The 19 remaining populations are in Shasta, southern Tehama, Butte, Glenn, and eastern Merced Counties (CDFG 1992; 58 **FR** 14338).

Reasons for Decline and Threats to Survival: At least nine historic populations of Greene's tuctoria have been eliminated by conversion of habitat to irrigated agriculture. Six historic populations are known or presumed to have been eliminated by overgrazing, and at least one population has been eliminated by urbanization. Agriculture, overgrazing and urban development continue to threaten most of the 19 remaining populations (CDFG 1992; 58 **FR** 14338), all of which are on private land. Four populations occur in The Nature Conservancy's Vina Plains Preserve, but three of these are grazed by cattle (CDFG 1992; 58 **FR** 14338).

Hairy Orcutt Grass *(Orcuttia pilosa)*

Species Description and Life History: The hairy Orcutt grass was listed as endangered on March 26, 1997 (62 **FR** 14338). This species was listed as endangered by the California Department of Fish and Game in 1979, and the California Native Plant Society has placed it on List 1B (rare or endangered throughout its range). Hairy Orcutt grass is a small, tufted annual in the grass family (Poaceae). The plant has several stems 2-8 inches tall, each stem ending in a long, spike-like inflorescence. Spikelets are strongly congested at the upper end of the inflorescence. The equal-length lemmas are deeply cleft into fine teeth that are sharp-pointed or short-awned. Foliage is grayish, with soft, straight hairs.

Historic and Current Distribution: Hairy Orcutt grass inhabits vernal pools in rolling topography on remnant alluvial fans and stream terraces. The historical range includes the eastern margins of Sacramento and San Joaquin Valleys from Tehama County south to Stanislaus County and through Merced and Madera counties. Only 24 of 34 historically known populations exist. More than one third of the remaining populations occur in Tehama County. Others are in Butte, Glenn, Madera and Stanislaus Counties. The species has been extirpated from Merced County.

Reasons for Decline and Threats to Survival: Conversion of vernal pool habitat to irrigated agriculture or to urban uses has been the primary factor leading to decline in this species. Of the 24 native, extant populations and 1 translocated population, only 12 populations are considered stable (Stone *et al.* 1988). Urbanization, agricultural land conversion, a highway expansion projects, discing, off-highway vehicle use, and competition from nonnative weeds continue to threaten most of the remaining populations.

Populations at the Nature Conservancy's Vina Plains Preserve are partially protected from disturbance. They were monitored during a baseline survey and weeded to reduce competition with nonnative species (Stone *et al.* 1988). Hairy Orcutt grass is found on Federal lands at the following locations: three populations occur on the Sacramento National Wildlife Refuge in

Tehama County and one population occurs on Bureau of Reclamation land in Fresno County. The translocated population of hairy Orcutt grass is found on land owned by the California State Department of Transportation. The remaining 21 populations occur on private lands.

Hartweg's Golden Sunburst *(Pseudobahia bahiifolia)*

Species Description and Life History: Hartweg's golden sunburst (also called Hartweg's pseudobahia) was listed as endangered on February 6, 1977 (62 **FR** 5542). It is a slender, woolly annual in the sunflower family (Asteraceae). It has one or a few stems 2-6 inches tall, with mostly narrow, undivided leaves, and yellow ray flowers. A member of the sneezeweed tribe (Helenieae), *Pseudobahia* is distinguished from related genera by characteristics of the leaves, flowers, and seeds. Hartweg's golden sunburst is distinguished from other members of the genus by the shape of its largest leaves, which are entire or three-lobed.

Hartweg's golden sunburst occurs in open grasslands and grasslands at the margins of blue oak woodland, primarily on shallow, well-drained, fine-textured soils of the Amador and Rocklin series. Both soil types exhibit strong Mima mound microrelief characterized by mounds roughly 1-6 feet high and 10-100 feet in diameter at the base, interspersed with basins that may pond water in the rainy season. Hartweg's golden sunburst nearly always occurs on the north- or northeast-facing slopes of such mounds, with the highest plant densities on upper slopes with minimal grass cover.

Historic and Current Distribution: Hartweg's golden sunburst is endemic to the Central Valley. Historically, it may have extended from Yuba County south to Fresno County, a range of 200 miles. Within this range, the species was only locally abundant. Today, it is limited to 16 populations on the eastern edge of the San Joaquin Valley. Remaining populations are concentrated in the Friant region of Fresno and Madera Counties and the La Grange region in Stanislaus County (California Dept. of Fish and Game 1992).

Reasons for Decline and Threats to Survival: Hartweg's golden sunburst has declined because of habitat loss caused by agricultural and urban development, levee construction, pumice mining, overgrazing by cattle, competition with nonnative weeds, road widening, and ORV (off-road vehicle) use. One population is protected under a conservation agreement between The Nature Conservancy and the U.S. Bureau of Reclamation. The remaining populations continue to be threatened by all these activities (CDFG 1992). This species was listed as endangered by the California Department of Fish and Game in 1981, and the California Native Plant Society has placed it on List 1B (rare or endangered throughout its range).

Mountain Plover *(Charadrius montanus)*

Species Description and Life History: The mountain plover was proposed for listing as threatened on February 16, 1999 (64 FR 7587). It is a medium-sized (8 to 9-inch long), dull brown shorebird that occurs in grassy upland habitats. During the breeding season the bird prefers level areas with short grass (buffalo grass and blue grama) and cactus. Grazing may be beneficial to the mountain

plover, as it reduces vegetation height. In mid- and tallgrass prairies, the species is associated with prairie dog towns. It can breed in loose colonies, with breeding areas shifting year to year (Graul 1975, Knowles *et al.* 1982). From 2-4 eggs are laid in a rudimentary nest (a slight depression in open ground). On the wintering grounds, mountain plovers congregate in flocks of fifteen to several hundred birds, feeding in alkaline flats, grazed pastures and plowed fields. Their diet consists primarily of insects, including beetles, grasshoppers and flies.

Historic and Current Distribution: The mountain plover formerly bred throughout the dry prairies of the western Great Plains from Montana to New Mexico and Texas. Nearly half the remaining breeding population is now found in Weld County, Colorado (Pawnee National Grassland) and Phillips County, Montana. Distribution elsewhere is very local. Wintering birds are found in California (Sacramento and San Joaquin Valley and Southern California), Arizona, Texas, and northern Mexico (Graul and Webster 1976, AOU 1983). Wintering populations of plovers in California have been declining (Garrett and Dunn 1981, Andrews and Righter 1992). Breeding Bird Surveys from 1966-1987 show a 61 percent range wide decline in mountain plover populations.

Reasons for Decline and Threats to Survival: Conversion of native prairies to croplands has significantly reduced the availability of suitable habitats for this species, producing a significant decline in the continental population. Secondary effects of pesticides on breeding behavior and reproductive success may also be contributing to the population decline.

Mountain Yellow-legged Frog (*Rana muscosa*)

Description of Species: The mountain yellow-legged frog is moderate in size, approximately 40-80 millimeters (1.5-3.25 inches) in length. Dorsal coloration and patterning are highly variable, with coloration varying from dark brown, gray, red, or green-brown (Jennings and Hayes 1994). The dorsal patterns range from discrete or poorly defined dark spots that are few and large, to small and numerous spots with a mixture of size and shapes (Zweifel 1955). The ventral surface and under surface of the hind limbs are yellow. Dorsolateral folds are present, but not usually prominent. The mountain yellow-legged from has no vocal sacs.

The mountain yellow-legged frog is found in glaciated lakes, ponds, springs, and streams in the Sierra Nevada in elevations extending from 1370 meters to 3650 meters. Habitat typically associated with this species include lodgepole pine, yellow pine, sugar pine, white fir, whitebar pine, and wet meadow vegetation associations. Although found in a wide range of stream types and classes, the species seem to prefer streams of low gradient and slow to moderate flow.

Mountain yellow-legged frog breed in June or July, soon after ice melt (Wright and Wright 1949; Zweifel 1995). Females deposit clumps of eggs attached to rocks, gravel, vegetation, or under banks (Zweifel 1955). Tadpoles overwinter at least once before metamorphosis. Eggs typically hatch in 18 to 21 days. Depending on elevation and length of summer, larvae may take as long as four summers to metamorphose (Center for Biological Diversity 2000). Due to the long

metamorphosis period, the species need breeding site that are wet throughout the year and are free of predatory fish. Reproductive maturity and longevity are unknown.

Large adults feed preferentially on terrestrial insects (Bradford 1983). Adults are typically found sitting on rocks along the shoreline, usually where there is little or no vegetation. Most frogs are seen on wet substrates within 1 meter of the water's edge. Adults are also thought to feed on tadpoles of Yosemite toads, Pacific tree frogs, and conspecifics (Heller 1960). Larvae are probably algae grazers.

Historical and Current Distribution: The mountain yellow-legged frog was historically the most abundant frog in the Sierra Nevada. It was ubiquitously distributed in high elevation water bodies from southern Plumas County to southern Tulare County (Jennings and Hayes 1994). Recent surveys have found that the frog has disappeared from 70 to 90 percent of its historic localities. The remaining populations are geographically isolated and consists of few breeding individuals (Center for Biological Diversity 2000).

Reason for Decline and Threat to Survival: Most of the known habitats for the mountain yellow-legged frog are within National Forests, National Parks and Wilderness Areas. However, human activities such as fish stocking, the introduction of bullfrogs, chemical pollution, and cattle grazing are adversely impacting their habitats.

Recent research by U.S. Geological Survey have documented transport of pesticides used in the Central Valley to the Sierra Nevada via wind currents. The first observed decline of the species was correlated with the use of second generation pesticides in the 1970's. Cattle grazing in National Forests have altered and continues to alter the hydrology and riparian vegetation of many sites that currently are or previously were suitable frog habitat. The introduced bullfrog predates upon many species of native frogs, including the yellow-mountain legged frog. Other factors contributing to the decline of the species include disease, acid rain, predation, and natural fluctuation in precipitation.

Perhaps one of the most significant factors of mountain-yellow-legged frog decline is the sport fish stocking program implemented by the California Department of Fish and Game (CDFG). Predatory fish did not historically occupy much habitat in high elevations. However, trout stocking programs beginning in the late nineteenth century has resulted in significant frog predation, and is likely to prevent recolonization of extirpated sites unless control measure are implemented (Bradford 1989, 1993). CDFG does not have policy to avoid stocking lakes where mountain yellow-legged frog are present (Center for Biological Diversity 2000). In 1993, the species was reintroduced into and successfully overwintered in Maul Lake in Hall Research Natural Area after it was cleared of fish. In the summer of 1994, however, thousands of fingerling trout was air dropped into the lake by the CDFG, thus terminating the project (Parker 1994).

Palmate-bracted Bird's-Beak *(Cordylanthus palmatus)*

Species Description and Life History: Palmate-bracted bird's-beak was listed as endangered on July 1, 1986 (51 **FR** 23767). Palmate-bracted bird's-beak is an annual herb in the snapdragon family (Scrophulariaceae). The plants are 4-12 inches tall and branched from near or above the base of the stem. The stems and leaves are grayish green and sometimes covered with salt crystals. The small pale whitish flowers, ½-inch to 1 inch long, are arranged in dense clusters (spikes) and densely surrounded by herbaceous leaflike bracts. Seedlings grow in late March or April. Flowers bloom from late spring through summer. Like other members of Cordylanthus and related genera, it is hemiparasitic (partially parasitic) on the roots of other plants.

Palmate bracted bird's-beak grows on seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations of less than 500 feet. Within these areas, palmate-bracted bird's-beak grows primarily along the edges of channels and drainages, with a few individuals scattered in seasonally-wet depressions, alkali scalds (barren areas with a surface crust of salts), and grassy areas. Palmate-bracted bird's-beak occurs in the Valley Sink Scrub and Alkali Meadow natural communities in association with other halophytes such as iodine bush (*Allenrolfea occidentalis*), alkali heath (*Frankenia salina*), glasswort (*Salicornia subterminalis*), seepweed (*Suaeda moquinii*) and salt grass (Bittman 1985, 1986a, Holland 1986, Coats *et al.* 1993, CDFG 1995). Population fluctuations are common in the palmate-bracted bird's-beak, and may be a result of changes in pollination success, rainfall patterns, freshwater influence and marsh pollution.

Historic and Current Distribution:

Historically, the species is known from scattered locations in Fresno and Madera Counties in the San Joaquin Valley, San Joaquin, Yolo, and Colusa Counties in the Sacramento Valley and the Livermore Valley area of Alameda County. It is currently known to occur in seven locations in the Sacramento, Livermore and San Joaquin Valleys. In approximate order from north to south, these are Sacramento National Wildlife Refuge (NWR) in Glenn County, Delevan NWR in Colusa County, Colusa NWR in Colusa County, the Woodland area, Springtown Alkali Sink near Livermore, western Madera County, and the combined Alkali Sink Ecological Reserve and Mendota Wildlife Management Area. The total occupied surface area over the seven locations is estimated at less than 741 acres. The Delevan NWR and Colusa NWR locations account for approximately 80% of the total number of individuals and the Springtown Alkali Sink meta-population accounts for another 19% (Center for Conservation Biology (CCB) 1994, CDFG 1995).

Reasons for Decline and Threats to Survival: Saline-alkali soils and alkali sink scrub habitats were historically rare throughout central California, but have been greatly reduced in extent by soil reclamation and draining of seasonal wetlands, conversion of land to agricultural use, urbanization, livestock grazing, and more recently by off-road vehicle use and trash dumping (CDFG 1992). The rarity of saline-alkali soils with natural vegetation and the intensive agricultural and urban development within the species' range make the likelihood of finding additional colonies remote.

Riparian Brush Rabbit (*Sylvilagus bachmani riparius*)

Species Description and Life History: The riparian brush rabbit was proposed for listing as endangered on November 21, 1997 (62 **FR** 62276). *Sylvilagus bachmani riparius* is one of 13 subspecies of *S. bachmani*. The riparian brush rabbit is a medium to small cottontail with color varying from dark brown to gray above to white underneath. The sides of the rostrum (nasal/upper jaw region of the skull) are noticeably convex when viewed from above instead of straight or concave as in all of the other subspecies (Orr 1940).

Habitat for the riparian brush rabbit consists of riparian forests with a dense understory shrub layer. Common plants in the habitat include California wild rose *(Rosa californica)*, Pacific blackberry *(Rubus vitifolius)*, wild grape *(Vitis californica)*, Douglas' coyote bush *(Baccharis douglasii)* and various grasses (Williams 1988, Basey 1990). Brush rabbits have small home ranges that usually conform to the size of available brushy habitat (Basey 1990).

Historic and Current Distribution: The riparian brush rabbit inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus Rivers in the northern San Joaquin Valley, California. Because the subspecies was not described until after it is believed to have been extirpated from most of its historic range, definitive information on its former distribution is lacking. It apparently has been extirpated from the Sacramento-San Joaquin River Delta and most of the lower San Joaquin River and its tributaries--the Stanislaus, Tuolumne, and Merced rivers (Williams 1986). The range of the subspecies probably extended farther upstream than the Merced River, assuming that suitable habitat historically occurred along the length of the San Joaquin River system (Williams and Basey 1986).

The riparian brush rabbit is currently restricted to a single population at Caswell Memorial State Park, San Joaquin County, along the Stanislaus River (Williams and Basey 1986). Surveys conducted in all potential habitat along the Merced, San Joaquin, Stanislaus and Tuolumne rivers during 1985 and 1986 failed to find any additional populations of riparian brush rabbits (Williams 1988). Recent peak population estimates are from 88 to 452 individuals (Williams 1988), 320 to 540 individuals (Basey 1990), and 170-608 individuals over 198 acres (Williams 1993). Williams (1988) estimated a population low of 10 or fewer individuals following severe winter flooding in 1985-86. The flooding during the winter of 1996-7 has also severely affected the population.

Threats to Survival and Reason for Decline: Potential threats to this species include habitat conversion to agriculture, wildfire, disease, predation, flooding, clearing of riparian vegetation, and the use of rodenticides. There has been a statewide reduction of riparian communities by nearly 90 percent (Katibah 1984) due to elimination and modification of riparian forests along valley floor river systems to urban, commercial, and agricultural development, wood cutting, reclamation and flood control activities, heavy groundwater pumping, river channelization, dam building, and water diversion. The species is at risk from the lack of elevated mounds with protective cover to serve as flood refuges within remaining riparian habitat.

Riparian Woodrat *(Neotoma fuscipes riparia)*

Species Description and Life History: The riparian woodrat was proposed as a federally endangered species on November 21, 1997 (62 **FR** 62276). It is one of 11 subspecies of *N. fuscipes*. It is a medium sized rodent that is predominantly gray and cinnamon above and whitish beneath, with white hind feet and a tail that is well furred, not scaled and more distinctly bicolored (lighter below contrasting more with the darker dorsal color) (Hooper 1938).

Riparian woodrats are most numerous where shrub cover is dense and least abundant in open areas. In riparian areas, highest densities of woodrats and their houses are often encountered in willow thickets with an oak overstory. They are common where there are deciduous valley oaks, but few live oaks. Mostly active at night, the woodrat's diet is diverse and principally herbivorous, with leaves, fruits, terminal shoots of twigs, flowers, nuts, and fungi. The young are born in stick nest houses, or lodges, on the ground, which measure 2 to 3 feet high and 4 to 6 feet in diameter. Most lodges are positioned over or against logs (Cook 1992, cited in Williams 1993). Unlike other subspecies, the riparian woodrat occasionally builds nests in cavities in trees and artificial wood duck nest boxes (Williams 1986).

Historic and Current Distribution: The riparian woodrat inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus rivers in the northern San Joaquin Valley, California. Historical records for the riparian woodrat are distributed along the San Joaquin, Stanislaus, and Tuolumne rivers, and Corral Hollow, in San Joaquin, Stanislaus, and Merced counties (Hooper 1938, Williams 1986). Thus, before the statewide reduction of riparian communities by nearly 90 percent (Katibah 1984), the riparian woodrat probably ranged throughout the extensive riparian forests along major streams flowing onto the floor of the northern San Joaquin Valley. Riparian woodrat populations today are greatly depleted, with the only known population at Caswell Memorial State Park with a possible second population near Vernalis, San Joaquin County. Williams (1993) estimated a peak population at Caswell of 437 animals, based on mean density of 4.8 woodrats per ha on 223 acres of suitable habitat.

Reason for Decline and Threats to Survival: Potential threats to this species include habitat conversion to agriculture, wildfire, disease, predation, flooding, drought, clearing of riparian vegetation, use of rodenticides and browsing and trampling by ungulates. There has been a statewide reduction of riparian communities by nearly 90 percent (Katibah 1984) due to elimination and modification of riparian forests along valley floor river systems to urban, commercial, and agricultural development, wood cutting, reclamation and flood control activities, heavy groundwater pumping, river channelization, dam building, and water diversion.

Sacramento Splittail (*Pogonichthys macrolepidotus*)

Species Description and Life History: The Sacramento splittail was listed as threatened in 1999 (64 **FR** 5963). The Sacramento splittail is included in the Recovery Plan for Sacramento/San Joaquin Delta Native Fishes (Service 1995).

Splittail are large fish in the cyprinid family (Cyprinidae), growing to more than 12 inches, and are distinctive in having the upper lobe of the caudal fin larger than the lower lobe. The body shape is elongate with a blunt head. Small barbels may be present on either side of the subterminal mouth. They possess 14 to 18 gill rakers, and their pharyngeal teeth are hooked and have narrow grinding surfaces. Dorsal rays number from 9-10, pectoral rays 16-19, pelvic rays 8-9, and anal rays 7-9. The lateral line usually has 60-62 scales, but ranges from 57-64. The fish are silver on the sides and olive grey dorsally. Adults develop a nuchal hump (*i.e.*, protuberance on the fishes' nape). During the breeding season, the caudal, pectoral, and pelvic fins take on a red-orange hue and males develop small white nuptial tubercles in the head region.

Splittail are primarily freshwater fish, but are tolerant of moderate salinities and can live in water with salinities of 10-18 parts per thousand. They are relatively long-lived (about 5-7 years) and are highly fecund (up to 100,000 eggs per female). Both male and female splittail mature by the end of their second year, although occasionally males may mature by the end of their first year and females by the end of their third year. Fish are about 7-8 inches when they attain sexual maturity (Service 1995).

In the tidal freshwater and euryhaline habitats of the Sacramento-San Joaquin estuary, spawning occurs by late January and early February and continues through July. Splittail spawn on submerged vegetation in temporarily flooded upland and riparian habitat. Typically terrestrial shrubs and herbs are preferred over emergent wetland vegetation such as cattails and tules. Spawning occurs in the lower reaches of rivers, bypasses used for flood management, dead-end sloughs and in the larger sloughs such as Montezuma Slough . Larvae remain in the shallow, weedy areas inshore near the spawning sites and move into the deeper offshore habitat as they mature. Splittail are benthic (bottom) foragers, which feed extensively on opossum shrimp (*Neomysis mercedis*) (Service 1995).

Historic and Current Distribution: Sacramento splittail are endemic to California's Central Valley where they were once widely distributed in lakes and rivers (Moyle 1976). Historically, Sacramento splittail were found as far north as Redding on the Sacramento River and as far south as the site of Millerton Lake (current site of Friant Dam) on the San Joaquin River (Rutter 1908). Rutter (1908) also found Sacramento splittail as far upstream as the current Oroville Dam site on the Feather River and Folsom Dam site on the American River. Sacramento splittail were common in San Pablo Bay and Carquinez Strait following high winter flows until about 1985 (Messersmith 1966, Moyle 1976, and Wang 1986).

The Sacramento splittail is found in the Sacramento River and Delta and is thought to be limited in its northward extent by the Red Bluff Diversion Dam in Tehama County. Splittail are now largely confined to: (1) the Delta, (2) Suisun Bay, (3) Suisun Marsh, (4) Napa River, (5) Petaluma River, and (6) other parts of the Sacramento-San Joaquin estuary (Turner 1966). On the San Joaquin River, a small number of splittail are found in tributaries below the confluence of Merced River. The distribution of splittail in the San Joaquin River may be limited in part by poor water quality, as the fishes move into the river only during wet years (US Fish and Wildlife Service 1996).

Reasons for Decline and Threats to Survival: The reason for decline in the San Joaquin River is mainly attributed to the loss of spawning habitat associated with the Central Valley Project and degradation of water quality in the San Joaquin River from increased agricultural practices (Service 1996). Recent declines from 1985 to 1992 in Sacramento splittail abundance in the Delta is concurrent with hydrologic changes to the Estuary. These changes include increases in water diversions during the spawning period from January through July. Diversions, dams and reduced outflow, coupled with severe drought years, introduced aquatic species, and loss of wetlands and shallow-water habitat (CDFG 1992) have reduced the species' capacity to reverse its decline.

A recent concern for the splittail survival is the recent decline in fitness and health of adult splittail taken at the pumps. Observation of reduced health and vigor, concurrent with increased dairy production and the reopening of the grasslands bypass, has led to speculation that selenium or some other toxic substance is impacting the species.

San Joaquin Kit Fox (*Vulpes macrotis mutica*)

Species Description and Life History: The San Joaquin kit fox was listed as endangered on March 11, 1967 (32 **FR** 4001). The San Joaquin kit fox was listed as endangered by the State of California in 1971. A recovery plan approved in 1983 proposed interim objectives of halting the decline of the San Joaquin kit fox and increasing population sizes above 1981 levels (Service 1983). The San Joaquin kit fox is now included in the Upland Species Recovery Plan (Service 1998).

The San Joaquin kit fox is a small canid, with an average body length of 20 inches and weighing about 5 pounds. They are lightly built, with long legs and large ears. Pelage color ranges from tan to buffy gray in the summer to silvery gray in the winter. The belly is whitish and the tail is black-tipped.

The diet of kit foxes varies geographically, seasonally and annually and includes small to mid-sized mammals, ground-nesting birds, and insects. Dens are used by the fox for temperature regulation, shelter from adverse environmental conditions, and escape from predators. Kit foxes excavate their own dens, use those constructed by other animals, and use human-made structures (culverts, abandoned pipelines, and banks in sumps or roadbeds). Kit foxes often change dens and many dens may be used throughout the year. However, evidence that a den is being used by kit foxes may be absent. Kit foxes are subject to competitive exclusion or predation by other species, such as the nonnative red fox *(Vulpes vulpes)*, coyote (*Canis latrans)*, domestic dog (*Canis familiaris*), bobcat (*Felis rufus*), and large raptors.

Historic and Current Distribution: In the San Joaquin Valley before 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side. Historically, San Joaquin kit foxes occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. By 1930, the kit fox range had been

reduced by more than half, with the largest portion remaining in the southern and western parts of the Valley. By 1958, an estimated 50% of the Valley's original natural communities had been lost, due to extensive land conversions, intensive land uses, and the use of pesticides. In 1979, only about 6.7% of the San Joaquin Valley's original wildlands south of Stanislaus County remained untilled and undeveloped. Today many of these communities are represented only by small, degraded remnants. Kit foxes are, however, found in grassland and scrubland communities, which have been extensively modified by humans with oil exploration, wind turbines, agricultural practices, and/or grazing. The population is fragmented, particularly in the northern part of the range.

The recovery plan calls for protecting the Carrizo Plain, western Kern County, and the Ciervo-Panoche Natural Area as core populations while reducing their isolation by managing populations on connecting private and public lands through conservation agreements.

Reasons for Decline and Threats to Survival: Loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices continue, decreasing the carrying capacity of remaining habitat and threatening kit fox survival. Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey populations.

San Joaquin Valley Orcutt Grass (*Orcuttia inaequalis*)

Species Description and Life History: The San Joaquin Valley Orcutt grass was listed as threatened on March 26, 1997 (62 **FR** 14338). It is a small, tufted annual in the grass family (Poaceae). The plant has several stems 2-6 inches tall, ending in a spike-like inflorescence. The foliage is grayish, with soft, straight hairs. San Joaquin Valley Orcutt grass is distinguished from other *Orcuttia* species by the shape of the lemma (part of the grass flower) and by the hat-like shape of the inflorescence at maturity. The plant occurs in vernal pools.

Historical and Current Distribution: San Joaquin Valley Orcutt grass is the only Orcutt grass restricted to the San Joaquin Valley. Historically, its range included the eastern margin of the valley from Stanislaus County to Tulare County. At least half these populations have been extirpated, including all of those in Stanislaus and Tulare Counties. Today, only 23 remaining populations are known, mostly in a 36-mile-long strip in Fresno, Merced, and Madera Counties (Stone et al. 1988).

Two populations of San Joaquin Orcutt grass occur on Federal land; a natural population is managed by the U.S. Bureau of Land Management (BLM), and a translocated population occurs on BLM land. Of the 21 known populations on private land, five are protected through conservation easements with The Nature Conservancy (TNC) on the Flying M Ranch in Merced County. In Fresno County, TNC also protects the Table Mountain site (CDFG 1993).

Reasons for Decline and Threats to Survival: Conversion of grasslands to agricultural use and activities associated with agriculture have eliminated at least five historically known populations

of this species. Urbanization has eliminated at least one additional population. Agricultural and urban development has probably eliminated additional undocumented populations. Several remaining populations continue to be threatened by flood control projects, continued urban and agricultural expansion and competition from nonnative weeds (Stone *et al.* 1988).

Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)*

Species Description and Life History: The valley elderberry longhorn beetle was listed as threatened on August 8, 1980 (45 **FR** 52803). Critical habitat was designated for the beetle in two areas in Sacramento County on May 7, 1980 (50 **CFR** 17.95i). The Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984) and Barr (1991) contains further details on the beetle's life history; references from these documents have not been repeated here. The valley elderberry longhorn beetle is a member of the family Cerambidae and is characterized by a somewhat elongate, cylindrical body with long antennae, often more than 2/3 of the body length. Males range in length from about 0.5 to nearly 1 inch (measured from the front of the head to the end of the abdomen) with antennae about as long as their bodies. Females are slightly more robust than males, measuring about 0.75 to 1 inch, with somewhat shorter antennae. Beetles are dark metallic-green with a bright red-orange border on the elytra (thickened, hardened forewings). Males generally have the metallic-green elytral pattern reduced to four oblong spots, exhibiting much of the red-orange color. Females and some males are mostly metallic-green and exhibit only a narrow band of red-orange color along the front margin of the elytra, resembling the subspecies *D. c. californicus*. The red-orange border eventually fades to yellow on museum specimens.

The valley elderberry longhorn beetle is dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests of the Central Valley. Use of the plants by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just before the pupal stage. Recent field work along the Cosumnes River and in the Folsom Lake area suggests that larval galleries can be found in elderberry stems with no evidence of exit holes. The larvae either succumb before constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems that are 1.0 inch or greater in diameter at ground level.

Historic and Current Distribution: Historical distribution of the beetle is not known, but specimens were collected in the Sacramento River, Putah Creek, American River, Calaveras River, and Merced River. The riparian forest that supports this species once covered thousands of acres in the Central Valley. The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. The beetle appears to be only locally common, i.e., found in population clusters that are not evenly distributed across available elderberry shrubs.

Reasons for Decline and Threats to Survival: Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development.

Frayer *et al.* reported that approximately 85 percent of all wetland acreage in the Central Valley was lost before 1939; and that from 1939 to the mid-1980's, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland next to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat.

Very little is known about the beetle's life history and its ecological requirements, and precise threats to its survival are difficult to enumerate. The primary threat to survival of the beetle, however, continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, as well as recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas and along road right-of-ways may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a food plant for beetle may also be a factor in its limited distribution.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Species Description and Life History: The vernal pool fairy shrimp was listed as threatened on September 19, 1994 (59 **FR** 48136). Fairy shrimps are aquatic crustaceans in the order Anostraca. They have delicate elongate bodies, large stalked compound eyes, no carapaces, and 11 pairs of swimming legs. They glide gracefully upside down, swimming by beating their legs in a complex, wavelike movement that passes from front to back. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The resting or "summer" eggs are known as "cysts." They are capable of withstanding heat, cold and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. The cysts hatch when the pools fill with rainwater. The early stages of the fairy shrimp develop rapidly into adults. These non-dormant populations often disappear early in the season long before the vernal pools dry up.

Vernal pool fairy shrimp inhabit pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. They have been collected from early December to early May.

Historic and Current Distribution: There are 32 known populations of the vernal pool fairy shrimp, extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to mainly agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply and flood control projects, and agriculture.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

The habitat of the listed vernal pool crustaceans is highly fragmented. This fragmentation results in small isolated populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987*a,b*). Should extinction occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to geographical isolation from other populations.

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

Species Description and Life History: The vernal pool tadpole shrimp was listed as endangered on September 19, 1994 (59 **FR** 48136). It has dorsal compound eyes, a large shield-like carapace that covers most of the body, and a pair of long cercopods at the end of the last abdominal segment. Tadpole shrimp climb or scramble over objects, as well as plowing along or within bottom sediments. Their diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates. This animal inhabits vernal pools containing clear to highly turbid water, ranging in size from 54 square feet to the 89-acre. The life history of the vernal pool tadpole shrimp is linked to the phenology of the vernal pool habitat. After winter rainwater fills the pools, the populations are reestablished from diapaused cysts, which lie dormant in the dry pool sediments. Sexually mature adults have been observed in vernal pools three to four weeks after the pools had been filled. Some cysts hatch immediately and the rest enter diapause and remain in the soil to hatch during later rainy seasons.

Historic and Current Distribution: The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to mainly agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply and flood control projects, and agriculture.

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Yosemite toad (*Bufo canorus*)

Description of Species: The Service was petitioned by the Center for Biological Diversity and the Pacific Rivers Council in February of 2000 to list the Yosemite toad as an endangered species. On October 19, 2000, the Service determined that listing of this species as endangered was warranted. The Yosemite toad occurs in the central high Sierra in wet meadows, and in seasonal ponds associated with lodgepole pine and subalpine conifer forests. Quiet pools in alpine meadows provide optimal habitat. *B. canorus* feeds on beetles, ants, mosquitoes, dragonfly nymphs, centipedes, and spiders (Grinnell and Storer 1924; Mullally 1953).

Historic and Current Range: This species range includes the vicinity of Grass Lake, El Dorado County, south of Kaiser Pass and Evolution Lake, Fresno County.

Reason for Decline and Threats to Survival: Cattle grazing has had serious effects on various amphibian species including the Yosemite toad. Long-term grazing has had an impact on the recruitment and age structure of Yosemite toad populations. Grazing cattle can also trample breeding ponds and juvenile toads in the meadows, destroy riparian vegetation (which is used as protective cover for adult amphibians), and erode stream banks. Toad populations may fail to reproduce as a result of poor water quality, a potential product of cattle defecation in breeding

ponds. In highly impacted areas, successful reproduction is often prevented due to poor health of adult toads. Other factors affecting *B. canorus* include the introduction of trout and bullfrogs, and pesticide drift from agricultural lands in the Central Valley.

Environmental Baseline

This section contains a description of the current status of the species and their habitats addressed in this biological opinion within the action area of the proposed project. The environmental baseline is organized by habitat type below.

Historically, the San Joaquin Valley was a rich mosaic of unique biological communities that supported more endemic vertebrate species than anywhere comparable in the continental United States. Today, the San Joaquin Valley is one of the most productive regions in the world for food, fiber, and fuel. Numerous past and ongoing Federal, State, local, and private actions have affected the species addressed in this opinion within the action area. These actions include agricultural development, urbanization, livestock grazing, water impoundment and diversion, predator and pest control, and gas and oilfield development. These human activities have jeopardized nearly all the unique biota of the Valley below the woodland belts, and are the major causes of endangerment of State and federally listed species. As human settlement and development in the San Joaquin Valley is mainly restricted by a constant supply of water, water impoundment and diversion have played an enormous role in the loss of the Valley's biotic communities. The earliest known community-sponsored irrigation canal was constructed in 1864 (Griggs 1992). For nearly one hundred years afterwards, the construction of other dams and canals diverted water from major rivers and lakes, and significantly lowered the water tables. This diversion of water dried up most of the freshwater marshes and riparian habitat, and exposed these historically wet areas to farming and development pressures. Similarly, water was delivered to areas that were historically arid, and much of the Valley was converted for agricultural purposes. The remaining natural communities have been reduce to narrow strands fringing the Valley floor, and is further degraded by exotic annual grasses and forbs, and encroaching development (Service 1998). Table 3.1 shows the existing land use data for the Chowchilla W.D. and Madera I.D.

In the face of rapidly disappearing communities and species endemic to the San Joaquin Valley, a growing number of Federal, State, local, and private individuals have begun efforts to conserve the remaining habitat and recover threatened species. The California Energy Commission and the Bureau of Reclamation have conducted important large-scale community and species surveys. Through the 1991 Friant Opinion, the Service and Reclamation established the Endangered Species Recovery Program (ESRP), whose purpose is to facilitate endangered species recovery through scientifically based recovery planning and implementation. ESRP is administered by California State University, Stanislaus, and has enormously contributed to the research and implementation of recovery efforts for upland species. Examples of conservation programs implemented by Reclamation, ESRP, and Friant Water Users Authority are listed in Appendix C. Other collaborative community-level conservation efforts are discussed in the San Joaquin Valley Upland Species Recovery Plan (Service 1998).

Table 3.1. Acreage and percentage of land use in Chowchilla and Madera CVP contract service areas.

Land Use	Chowchilla W.D.		Madera I.D.	
	(acres)	(percent)	(acres)	(percent)
Orchard/Vineyard	27,289	31.97	92,912	71.16
Crop/Pasture	44,728	52.4	16,225	12.43
Grassland and Shrublands	4,844	5.67	6,097	4.67
Fallow	4,289	5.02	4,836	3.70
Urban/Mixed	883	1.03	6,490	4.97
Feedlot	1,232	1.44	480	0.37
Residential	868	1.02	584	0.44
Road and Utility R.O.W.s	423	0.50	766	0.59
Industrial	273	0.32	894	0.68
Commercial	364	0.43	669	0.51
Water	23	0.03	402	0.31
Upland Forest	66	0.08	133	0.10
Non-forested Wetland	82	0.10	66	0.05
Forested Wetland	0	0	10	0.01
Total Acreage	**85,364**		**130,564**	

While loss and degradation of habitat associated with human activity in the San Joaquin Valley can be closely tied to the impoundment and delivery of water, it is difficult to determine to what extent implementation of the CVP has contributed to this lost. Through previous biological opinions, Reclamation has begun large-scale monitoring and mapping efforts in order to more accurately assess the impacts associated with continued operation of the CVP. However, this effort was not completed in time for this consultation. Due to the short time allocated to the completion of the biological opinion, the Service did not have time to research an extensive habitat and species baseline; therefore, the information provided below is general and fragmentary.

In an effort to quantify impacts of the CVP, the Service has used the best available scientific and commercial information, and compared land use and habitat data from three sources estimating San Joaquin valley habitats during historical times, approximately 1940, and their current status. Table 3.2 compares potential habitat estimates from historic times (Kuckler 1977) to data circa CVP implementation (Weislander) to GAP analysis data from 1991. Weislander did not estimate wetland and aquatic habitats. Additionally, the baseline for each species is described below by its habitat associations.

Table 3.2. Estimated changes in acres of habitat over time in the eastern San Joaquin Basin by habitat type.

Habitat Type	Historic Times (Kuckler)	1935-1945 (Weislander)	1991 (GAP Analysis)
Conifer	767,539	876,520	483,776
Montane Hardwood Conifer	282,649	--	--
Cismontane Woodlands	1,974,633	1,427,026	1,494,495
Riparian	288,551	--	18,576
Shrub-scrub	92,792	--	1,970
Chapparral	142,535	315,643	215,812
Grassland	2,451,295	1,318,560	915,802
Natural Wetlands	217,221	--	11,610
Aquatic Habitats	--	--	49,707
Developed Lands	--	1,996,818	2,447,553
Barren Lands	--	--	10,243
Totals	5,934,566	5,934,567	5,932,193

Vernal Pools

Vernal pools are ephemeral wetlands that typically form in shallow depressions underlain by a substrate near the surface that restricts the percolation of water. These depressions fill with rainwater and runoff from adjacent areas during the winter and may remain inundated until spring or early summer, sometimes filling and emptying more than once during the wet season. Vernal pools are frequently clustered into assemblages known as vernal pool complexes. Individual pools within a vernal pool complex are mutually interdependent in supporting listed vernal pool species; when a species is extirpated from an individual pool, other pools in the complex may serve as recolonization sources. Upland habitat and swales around and within a vernal pool complex are essential to the hydrological and biological integrity of the complex. Vernal pools are habitat to numerous animal and plant species, including many that are obligate species.

Using aerial and satellite imagery, Holland (1997) mapped the remaining vernal pool habitat in the Central Valley in 1997, and calculated habitat loss by County since previous mapping efforts (Table 3.3). Holland estimated that there are less than 1,000,000 acres of vernal pool habitat remaining in the Central Valley, a 75 percent loss since pre-agricultural times. In September 1999, U.S. Fish and Wildlife Service Biologist Chris Davis at the Sacramento Office expanded upon Holland's efforts to summarized habitat loss since 1997 in the five counties that receive Friant and Cross Valley CVP water, including the two counties receiving Buchanon and Hidden CVP contract

water supplies, as summarized below. Buchanan and Hidden contract service areas are in Madera and lower Merced County.

Table 3.3. Loss of vernal pool habitat as calculated by Holland (1997) and Davis (1999).

County	Vernal Pool [1] Grasslands (acres) (year)	Vernal Pool [1] Grassland–1997 (acres)	Known Habitat Lost [2] since 1997 (acres/# sites)	Percent Loss since [Year]
Fresno	27,995 (1994)	27,459	200/1	2% since 1994
Kern	7,399 (1990)	6,848	1,325/5	10% since 1990
Madera	91,178 (1987)	87,047	5,040/5	10% since 1987
Merced	282,741 (1987)	252,424	3,180/3	12% since 1987
Tulare	36,907 (1993)	34,900	75/2	6% since 1993
Total	> 446,180 (1987)	408,678	9,820/15	>10.6% since 1987 2.5% since 1997

[1] Holland 1998.

[2] Davis 1990. Includes sites that support endangered species habitat that were not mapped by Holland (1998) as "vernal pool grasslands".

This rapid destruction and degradation of vernal pool habitat have put many obligate vernal pools species on the Federal Endangered Species Act. Listed species endemic to vernal pools found in Hidden and Buchanan project area include: Colusa grass, Conservancy fairy shrimp, fleshy owl's-clover, hairy Orcutt grass, San Joaquin Valley Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

It is uncertain how much vernal pool habitat has been protected, created, or restored. In 1999, the Sacramento Office reviewed all section 7 consultation dealing with vernal pool fairy shrimp and tadpole fairy shrimp since its listing in 1994, in response to a petition for delisting (Service 1999). The review determined that for 48,202 acres of habitat (including uplands) that were developed, 300 acres of vernal pools were created or restored, and 563 acres were protected in perpetuity. These protected, created, or restored pools represent one percent of the remaining vernal pool habitats, and are distributed in more than 14,500 acres of conservation lands scattered throughout the Central Valley. However, protected lands in the San Joaquin Valley only represents only a small amount of these preserved lands.

Grassland and Scrub Habitats

Grasslands are defined as habitats dominated by perennial or annual grasses, and scrub communities are defined as habitats dominated by shrubs that are less than 2 feet tall. In the San Joaquin Valley, scrub habitats occur in alkali sinks, on alluvial fans, on dune remnants, and in arid uplands. A comparison of the 1991 GAP Analysis data to the estimates of historic habitat

coverage, presented in Table 3.2, shows that approximately 40 percent of grassland and scrub habitat remain in the three basins which include the Friant and Cross Valley Service Areas.

The species that inhabit grassland and scrub habitats, or use these habitats in part of their life cycle that are addressed in this opinion include: palmate-bracted bird's-beak, San Joaquin woolly threads, Fresno kangaroo rat, blunt-nosed leopard lizard, San Joaquin kit fox, and the mountain plover. The following sections describe the status of the species that occur in grasslands and scrub habitats for some or all of their life cycle.

Palmate-bracted Bird's-beak

As a result of intensive survey efforts and additional introductions, palmate-bracted bird's-beak now is known to occur in seven metapopulations; five north of the Friant and Cross Valley Districts, and two in the San Joaquin Valley. The populations in the San Joaquin Valley are within 10 miles of the Fresno Irrigation District. Changes in the hydrologic regime by drainage, diking, and channelization have interrupted the seasonal overland flows and altered water salinity near the populations closest to the Fresno Irrigation District (Service 1998). The number of populations has been shrinking, and the numbers of plants extant in each population has also been shrinking. Of nine historical populations only two were known to still exist in 1985 (50 **FR** 28870).

San Joaquin Kit Fox

Loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices continue to affect San Joaquin kit foxes. Loss of habitat contributes to San Joaquin kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey. The isolation of remaining habitat fragments coupled with habitat degradation and barriers to movement, such as aqueducts and busy highways, limits dispersal and threaten survival of San Joaquin kit fox populations (Service 1998).

Natural lands along the edges and within the San Joaquin Valley are considered suitable habitat for San Joaquin kit foxes. Kit foxes can also forage and den on rangeland; other types of cropland have little to no value for kit fox. Satellite populations essential for recovery of the species are found in Friant and Cross Canal Water Contractors districts in Merced and Madera Counties, and in Tulare and Kern Counties. North-south linkages between these populations are essential.

San Joaquin kit fox population trends are downward throughout the species' range (Asserson and Williams 1999, personal communications). Detailed studies of the western Kern County population have recently been conducted. Population monitoring of San Joaquin kit fox at the former Naval Petroleum Reserve on the west side of Kern County indicated a general decline population. 141 individuals were captured in 1981, as compared to 24 individuals in 1996 (Department of Energy 1998). Reasons for the decline are not fully understood and are probably complex. The decrease in fox captures from 1995 to 1996 may be caused in part by a decrease in the abundance of kangaroo rats, other rodents, and lagomorph prey species, possibly depressing overall reproductive success and survival (Otten and Cypher 1997).

CDFG biologists regularly conduct nighttime spotlight surveys for kit foxes along a route that includes portions of State Route 58. The biologists frequently observe kit foxes along this route. Survey results from the route indicate a decline in kit fox numbers over the last several years. In other areas of Kern and San Luis Obispo Counties, occurrences of San Joaquin kit fox are more fragmented. Some San Joaquin kit foxes have managed to find foraging and denning habitat within the City of Bakersfield, especially along the Kern River.

Fresno Kangaroo Rat

The Fresno kangaroo rat is near extinction, with loss of habitat to cultivation and year-round grazing (which typically requires supplemental feeding) as the major threats to the species' survival (Service 1998). There are no confirmed populations of Fresno kangaroo rat, however, staff of the ESRP identified two population of San Joaquin kangaroo rats believed to be the Fresno subspecies. Genetic and morphometric studies of these population are in progress to determine subspecies (Service 1998). There may be unknown populations of Fresno kangaroo rat still existing in its historical range in Merced, Madera, and Fresno Counties, including the Chowchilla Water District and Fresno Irrigation District service areas.

Blunt-nosed Leopard Lizard

Blunt-nosed leopard lizards currently occupy scattered parcels of undeveloped lands on the Valley floor, and occur in the foothills of the Coastal Range. While the blunt-nosed leopard lizard can occupy grassland used for grazing it prefers lands with scattered shrubs and sparse grass/forb cover. Habitat for the blunt-nosed leopard lizard has been lost or degraded due to row crops, pesticide application, oil development, urban development, and off-road vehicle use (Service 1998).

Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Disturbances and modifications of habitats within areas of mineral and petroleum development pose lesser, but continuing threats as they degrade the habitat. Direct mortality occurs when animals are killed in their burrows during construction, killed by vehicle traffic, drowned in oil, or fall into excavated areas from which they are unable to escape. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization.

Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. Unlike cultivation of row crops, which precludes use by leopard lizards, light or moderate grazing may be beneficial. The use of pesticides may directly and indirectly affect blunt-nosed leopard lizards. The insecticide Malathion has been used since 1969 to control the beet leafhopper, and its use may reduce insect prey populations. Fumigants such as methyl bromide are used to control ground squirrels. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned.

In recent years, above average precipitation seems to have increased the amount of vegetative cover. This increase in cover may be a factor in the low abundance of adult lizards seen during

population monitoring in western Kern County in 1995 (U.S. Department of Energy and Chevron 1996). Western Madera County has been identified by the Recovery Plan (Service 1998) as an important area to protect for the recovery of the species. Delisting criteria for the species includes protection of 6,000 acres of contiguous, occupied habitat in Merced or Madera County. Methods of protection proposed in Madera include protecting important links in the chain of island habitats through acquisition of title or easement, and continuing agricultural uses that support the populations, such as cattle grazing and natural gas extraction.

Mountain Plover

A combination of conversion of grassland habitat, agricultural practices, livestock grazing, decline of native herbivores, and pesticide use in its breeding and wintering habitats are factors that likely have contributed to the mountain plover's decline. Pesticides are applied to cultivated fields during the 5 months that mountain plovers occupy their winter habitat in California (Knopf 1996*b*).

The 1998 California Bird Census found 2179 mountain plovers in 10 California counties, including Imperial, Kings, Los Angeles, Monterey, Riverside, San Benito, San Luis Obispo, San Bernardino, Solano, and Yolo Counties (Hunting, in litt., 1998). While mountain plovers were not counted in Kern County, they were seen in surrounding counties, and they are likely to be present in western Kern County.

Riparian Habitat

Much of the historical riparian habitat along San Joaquin River has been lost due to water diversions associated with CVP, agricultural and residential encroachment. Except for water required to satisfy downstream riparian rights, most water from the Friant dam is diverted for agricultural, municipal, and industrial use. In fact, the reach of river between Friant Dam and Gravelly Ford dries up intermittently. In the mid-1980's, it was estimated that only 5.8 percent of riparian habitat along the San Joaquin remained. The acreage is likely to be much less today (Service 1998).

In past years, Reclamation has been working with the Service, ESRP and other partners to initiate recovery efforts for these riparian species. Projects included censussing riparian brush rabbit and riparian woodrat populations in Caswell Memorial State Park, investigating protection of the Park, and working to establish an experimental population of riparian brush rabbit on Reclamation owned land along Kings River in Fresno County. Friant Water Users Authority has also been cooperating with Natural Resource Defense Council to conduct a feasibility study to restore natural hydrological and ecological function to the San Joaquin River. A summary of recovery projects implemented by Reclamation, Friant Water Users Authority, and ESRP are attached as Appendix C.

According to the Water Districts, the Fresno and Chowchilla Rivers are historically intermittently dry during summer months. The construction of the dams changed the timing of surface flow in the rivers. Historically, the majority of the water was conveyed down the river during the winter months, flooding the river banks to support riparian vegetation. Today, water is conveyed down

the river during the winter and the agricultural growing season (summer and fall). This control water release reduced or eliminated the historical flooding cycles necessary to sustain riparian habitat. The increased reliability of the water also facilities conversion and development of riparian habitat. Most of the riparian habitat along Chowchilla and Fresno Rivers have been converted to agricultural uses. The remaining riparian woodland habitat within the project area is only found in the reach of the stream immediately below the dam. Vegetation founds along the Fresno and Chowchilla Rivers include Fremont's cottonwood, red willow, sandbard willow, and Goodding's willow.

Listed, proposed and candidate species that inhabit riparian habitat include: riparian brush rabbit, riparian woodrat, and valley elderberry longhorn beetle.

Riparian Brush Rabbit and Riparian Woodrat

The riparian brush rabbit is currently restricted to a single population at Caswell Memorial State Park, San Joaquin County, along the Stanislaus River (Williams and Basey 1986). The riparian woodrat is also restricted to Caswell Memorial State Park, with a possible second population near Vernalis, San Joaquin County. Williams (1993) estimated a peak population at Caswell of 437 animals, based on mean density of 4.8 woodrats per ha on 223 acres of suitable habitat. Surveys conducted in all potential habitat along the Merced, San Joaquin, Stanislaus and Tuolumne rivers during 1985 and 1986 failed to find any additional populations of riparian brush rabbits (Williams 1988). Recent peak population estimates are from 88 to 452 individuals (Williams 1988), 320 to 540 individuals (Basey 1990), and 170-608 individuals over 198 acres (Williams 1993). Williams (1988) estimated a population low of 10 or fewer individuals following severe winter flooding in 1985-86. The flooding during the winter of 1996-97 has also severely affected the population. In recent years, ESRP has been working with Reclamation to recover these imperiled species. An ongoing project involves establishing an experimental population of riparian brush rabbits along Kings River in Fresno County, outside its historical range. Other recovery efforts by ESRP, Reclamation, and Friant Water Users are summarized in Appendix C.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is patchily distributed throughout the Central Valley from Redding to Bakersfield area. In the summer of 1991, the Service conducted a survey of 230 sites through its range. Adults were found along Coarse Gold Creek, a tributary of Fresno River. Evidences of beetle (exit holes) were found at several sites along Fresno River (Service 1991). No individuals were founds along the Chowchilla River and along the San Joaquin River upstream of the confluence of Merced. However, river access was poor, and only a few sites were surveyed. The San Joaquin River supported healthy stands of elderberry, and exit holes and adults were sighted in the River in 1986, and 1989 (Service 1991).

Aquatic Habitats

The extensive network of rivers, streams, lakes, and wetlands in the San Joaquin Valley is mainly fed by snow melt in the Sierra Nevada and once supported millions of migratory bird and fish

species. Today, dams block migratory fish from their spawning grounds, and the canals divert the majority of the water that once supported extensive freshwater marshes and riparian habitats. Large lakes in the Tulare Basin, including Buena Vista Lake and Tulare Lake, which covered 700 to 800 square miles, are completely dried. The San Joaquin River, which drains the entire Valley through tributaries, is intermittently dry below the confluence of Merced River. A study in 1992 by the California Energy Commission found only 800 acres of degraded wetlands in the southern San Joaquin Valley (Spiegel and Anderson 1992).

According to the Water Districts, the Fresno and Chowchilla Rivers are historically intermittently dry during summer months. After the construction of the dams, water flow below the dam is more controlled with less water being conveyed down the rivers Rivers during winter months. However, all water released from the dam is delivered to contracted water users, and no water reaches the San Joaquin River, except in extreme wet years.

Listed, proposed and candidate species that inhabit riparian habitat include: Aleutian Canada geese, California red-legged frog, California tiger salamander, delta smelt, and the Sacramento splittail. The following sections describe the status of the species that occur in aquatic habitats.

Aleutian Canada geese

The Aleutian Canada geese winter in the northern San Joaquin Valley. The decline of Aleutian Canada geese is largely associated with predation in its breeding grounds in Alaska. Historically, this species used the extensive lakes and freshwater marshes in the Valley. Since human settlement, agricultural fields, particularly corn fields and man-made stock ponds have supported this wintering population. In recent years, the conversion of agricultural lands to residential and commercial development some of the habitat used by Aleutian Canada goose as feeding grounds.

California red-legged frog

The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. The species is still common in the San Francisco Bay area (which includes Alameda County) and along the Central Coast. Other populations are believed to be isolated or extirpated. Land conversion in the Buchanan and Hidden Units have eliminated most habitats for the California red-legged frog. Existing lands in these service areas are believed to be marginal habitats for the species.

The introduction of bullfrogs, crayfish, and non-native sport fish has been and continues to be a significant threat to red-legged frogs. Several researchers have noted the decline and eventual disappearance of California red-legged frogs once bullfrogs become established at the same site (Service 2000). Hayes and Jennings (1988) also found a negative correlation between abundance of introduced fish species and California red-legged frogs. In ponds with both non-native fish and bullfrogs, California red-legged frogs are usually eliminated following the introduction (Christopher *in litt.* 1998). Bullfrogs were introduced in the late 1800's and continue to expand their range because they have a competitive advantage over native frogs (Hayes and Jennings 1986) and its larvae are unpalatable to predatory fish (Kruse and Francis 1977). Predatory fish are still

being stocked throughout the Central Valley through sport fish stocking program and mosquito abatement efforts. Changes in habitat associated with these efforts tend to make the habitat less-favorable to California red-legged frogs and more suitable for bullfrogs, thus confounding the detrimental effects.

California red-legged frog population numbers are not precisely known, and there has not been a recent scientific estimate on the rate of the decline, but many of the remaining populations appear to be declining at a rapid rate. Only three populations were thought to have more than 350 adult frogs when the species was proposed in 1994. Of those three populations, only one is thought to remain intact, one has declined to such an extent that detections are unlikely, and the third is thought to be in decline.

California Tiger Salamander

The California tiger salamander has been eliminated from 54 percent of it's historic breeding sites, and has lost an estimated 65 percent of it's habitat (CNDDB 1998; D. Harvey and G. Canterbury, Service, pers. comm. 2000). Their current range of is restricted to California from the Santa Rosa Plains, Sonoma County, south through the coast ranges to Santa Barbara County, and in the Central Valley and surrounding foothills from southern Colusa County south to northwestern Kern County on the west side of the valley. The distribution of the species is discontinuous and fragmented throughout it's range.

Approximately five percent of remaining populations occur on government-owned lands; the rest are on private lands. The two remaining strongholds for the species include: (1) Alameda and Contra Costa counties, where the cities of Brentwood, Livermore, Dublin, Pleasanton, and housing developments in unincorporated portions of those counties, are rapidly expanding, and where the Los Vaqueros Reservoir project is under construction; and (2) portions of Madera and Fresno Counties west and south of Millerton Lake where the Rio Mesa area plan (which covers approximately 15,000 acres in southeast Madera County) and several large developments in the vicinity of Friant are planned. These developments threaten to permanently reduce the amount of grassland and ground squirrel habitat available to California tiger salamanders, and to destroy the natural ephemeral bodies of water they require.

Delta smelt

According to the seven abundance indices which provide information on the status of the smelt, this species was consistently at low population levels through the 1980's (Stevens *et al.* 1990). These same indices also showed a pronounced decline from historical levels of abundance (Stevens *et al.* 1990).

The summer townet abundance index measures the abundance and distribution of juvenile smelt and provides data on the recruitment potential of the species. The summer townet abundance index constitutes one of the more representative indices because the data have been collected over a wide geographic area (from San Pablo Bay upstream through most of the Delta) for the longest period of time (since 1959). Since 1983, (except for 1986, 1993, and 1994), this index has

remained at consistently lower levels than previously found. The final summer townet index for 2000 was 8.0, a decline from the 11.9 index for the 1999 summer townet. Both of these indices represent an increase from the 1998 index of 3.3. However, both 1999 and 2000 indices are still below the pre-decline average of 20.4 (1959-1981, no sampling 66-68).

The second longest running survey (since 1967), the fall midwater trawl survey (FMWT), measures the abundance and distribution of late juveniles and adult smelt in a large geographic area from San Pablo Bay upstream to Rio Vista on the Sacramento River and Stockton on the San Joaquin River (Stevens *et al.* 1990). The FMWT indicates the abundance of the adult population just prior to upstream spawning migration. Until recently, except for 1991, this index has declined irregularly over the past 20 years (Department, unpublished data, 1999). Since 1983, the smelt population has exhibited more low FMWT abundance indices, for more consecutive years, than previously recorded. The 1994 FMWT index of 101.2 was a continuation of this trend. This occurred despite the high 1994 summer townet index for reasons unknown. The low 1995 summer townet index value of 3.3 resulted in a high FMWT index of 839 reflecting the benefits of large transport and habitat maintenance flows due to an extremely wet year.

The 1999 FMWT index of 717, which is an increase from 1998's index (417.6), is the third highest since the start of decline of smelt abundance in 1982. The FMWT abundance index (127) for 1996 represented the fourth lowest on record. The 1997 abundance index (360.8) almost tripled since the 1996 survey, despite the low summer townet index (4.0). Despite this recent trend, the recovery criteria, including both abundance and distribution criteria, which is based on numbers derived from the FMWT, have not been met to date.

During May and June of 1999, over 100,000 smelt were incidentally taken at CVP facilities near the Delta. The allocated incidental take for those two months is 20,478. Additionally, in May and June 2000, 92,000 smelt were taken at CVP facilities in the south delta, potentially reducing the population's ability to recover (Reclamation, unpublished data, 2000).

Giant Garter Snake

Endemic to wetlands in the Sacramento and San Joaquin valleys, the giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields. Giant garter snakes are typically absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1980, Rossman and Stewart 1987, Brode 1988, Hansen 1988). Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1980). However, rice farming practices are compatible with giant garter snake, and have become increasing important in sustaining garter snake populations with the loss of wetlands in the Central Valley. The California Rice Industry Association have developed a pamphlet, Managing Ricelands for Giant Garter Sankes, to help growers protect giant garter snakes.

Through previous CVP consultations, Reclamation has completed a final draft of the CVP Operation and Maintenance Plan: Protection of Endangered Species, which specifies measure to

reduce impacts of routine maintenance procedures to giant garter snakes and their habitat and other listed species. Development of integrated pest management procedures, erosion control plans, and site-specific measures are scheduled to be completed by the year 2003.

Sacramento Splittail

In recent times, dams and diversions have increasingly prevented upstream access to large rivers and the species is restricted to a small portion of its former range. Splittail enter the lower reaches of the Feather and American rivers on occasion, but the species is now largely confined to the Delta, Suisun Bay, and Suisun Marsh (Service 1995). Stream surveys in the San Joaquin Valley reported observations of splittail in the San Joaquin River below the mouth of the Merced River and upstream of the confluence of the Tuolumne River (Saiki 1984 as cited in Water Resources and Reclamation 1994).

The 1985 to 1992 decline in splittail abundance is concurrent with hydrologic changes to the Estuary. Splittail have experienced a decline in population as a result of hydrologic changes in the Estuary and loss of shallow water habitat due to dredge and fill activities. These changes include increases in water diversions during the spawning period from January through July.

Most of the factors that caused smelt to decline have also caused the decline of splittail. These factors include (1) diversions, (2) dams and (3) reduced outflow, coupled with (4) severe drought years, (5) introduced aquatic species such as the Asian clam (Nichols *et al.* 1986) and striped bass, and (6) loss of wetlands and shallow-water habitat and appear to have perpetuated the species' decline. These factors have reduced the species' capacity to reverse its decline (Moyle *et. al.* 1992).

Analyses of survey data collected from 1967 to 1993 (Meng 1993, Meng and Moyle 1995), and data from 1967 to 1997 by the Service, Department, UCD, and biologists from several different studies noted the following trends:

(1) Overall, splittail abundance indices have declined. Splittail populations are estimated to be 35 to 60 percent of what they were in the 1940's, and these estimates may be conservative (Moyle in prep). Department FMWT data indicate a decline from the mid-1960s to the late 1970s, followed by a resurgence, with yearly fluctuations, through the mid-1980s. From the mid-1980s through 1994, splittail numbers have declined in the Delta, with some small increases in various years. 1998 FMWT index of 281 was the largest on record, however, in 1999 the index dropped to 39, which is below mid 1980 levels.

(2) Overall splittail abundances vary widely between years. Sommer *et al.* (1997) also found that splittail recruitment success fluctuates widely from year to year and over long periods of time. During dry years abundance is typically low. During the dry years of 1980, 1984, 1987, and 1988 through 1992, splittail abundance indices for young-of-the-year were low, indicating poor spawning success. Additionally, all year class abundances were low during these years. In 1994, the fourth driest year on record, all splittail indices were extremely low.

Wet years are assumed to provide essential habitat for splittail and allow populations to rebound from dry years. Successful reproduction in splittail is often highly correlated with wet years. Large pulses of young fish were observed in wet years 1982, 1983, 1986, and 1995. In 1995, one of the wettest years in recent history, an increase in all indices was recorded, as in 1986, which was another wet year following a dry year. However, young of the year taken per unit effort (for example, either the number of fish per net that is towed or the number of fish per volume of water sampled) has actually declined in wet years, from a high of 12.3 in 1978 to 0.3 in 1993. The updated data from the Department demonstrate this same decline in wet years, from 37.3 in 1978 to 0.6 in 1993. The abundance indices of young of the year splittail during the years of 1995, 1996, and 1997 were 44.5, 2.1, and 2.6, respectively. In 1995, a very wet year, splittail abundances were high. However in 1996 and 1997, both wet years, abundance indices were low. 1998 was a wet year with a large splittail year class produced.

(3) Concentration of splittail in shallow areas suggests that they are particularly vulnerable to reclamation activities, such as dredging, diking, and filling of wetlands.

The above data indicate that splittail abundances vary widely in response to environmental conditions, and show that the general population numbers are declining.

4. Effects of the Proposed Action and Cumulative Effects

This biological opinion analyzes the reasonably foreseeable effects of implementation of the Hidden and Buchanan Unit long-term water contracts over a period of 25 years, from the year 2001 through 2026. Renewal of these contracts or water deliveries beyond 25 years is not covered in this consultation. Below, we divide the effects of the water contracts into (1) effects of continuing delivery of water and its application for *existing* uses, and (2) effects of Federal water on water availability and conversion of listed species habitat to non-habitat after the Friant biological opinion of 1991.

Some actions related to the proposed action are not considered in this opinion. These related actions require separate section 7 consultation, and include but may not be limited to: operations and maintenance activities undertaken by the Army Corps of Engineers, by Reclamation, or by Buchanan or Hidden CVP water users for activities related to storage, conveyance, and usage of CVP water; water transfers, assignments, and exchanges by Hidden or Buchanan CVP contractors, including flood flows (215 water), and Warren Act contracts for conveyance of non-federal water using federal facilities. Reclamation should consider whether it may have a duty to avoid irreversible or irretrievable commitments toward related actions subsequent to the initiation of the present consultation and before any biological opinion is completed for a related action. The incidental take statement accompanying this biological opinion will not authorize any incidental take of listed species associated with the long term contracts or related actions.

Assumptions. In any 25-year extrapolation on the scale of the current consultation, a number of assumptions have to be made. This subsection, while not exhaustive, lays out some of the assumptions we have made in order to complete this effects analysis. Failure to meet any of these assumptions may be grounds for re-initiation of this consultation.

1. We assume the proposed action will be implemented in all particulars as described in the Project Description section, above, and any documentation referenced in that section, such as appendices or attached documents.

2. We assume the term of the contracts will be 25 years, and that Reclamation will consult under section 7 of the ESA on any subsequent renewal of the contracts with full authority to revise the contracts as may be necessary at that time.

3. We assume Reclamation will initiate, provide adequate information for, and complete consultations on actions interrelated with this consultation, including but not limited to exchanges, assignments, transfers, conveyance, and management of flood waters (215 water, etc.).

4. We assume that the Army Corp of Engineers will complete section 7 consultation with the Service for its Operation and Maintenance activities associated with Eastman and Hensley Lakes,

including but not limited to, its release downstream for flood control, compliance with prior riparian water rights, and CVP water contract supplies, within one year of the issuance of this biological opinion.

5. We assume water deliveries will continue to be impacted by existing climate and hydrology; actions and statutes including, but not limited to existing biological opinions (i.e., 1995 OCAP), existing implementation of the CVPIA, and conformance and adherence to additional existing State and Federal regulations and guidelines; and socio-economic factors. This effect analysis is conducted under the expectation that water will be delivered to CVP service contractors in quantities that approximate historic deliveries (1988 through 1997), as given in Appendix D of the November 21, 2000 programmatic biological opinion on Implementation of the CVPIA and continuing operation and maintenance.

6. The analysis for this opinion is based on the assumption that CVP water contract amounts and deliveries will remain consistent with those provided and analyzed in the Final PEIS for CVPIA. We assume Reclamation will initiate formal consultation under section 7 of the ESA on any infrastructure modifications or other actions which result in modification of the current delivery regime to Buchanan and Hidden CVP water contractors, and may affect federally listed species and/or their critical habitat.

Existing uses. For almost four decades, Reclamation has been diverting water from the Chowchilla and Fresno Rivers and delivering contract water to Chowchilla Water District and Madera Irrigation District users. This water is applied to row crops, orchards, vineyards, irrigated pasture, and various other uses that is considered to be an irrigation use pursuant to State law (See definition under Appendix A). It is the Service's understanding that the proposed contracts would provide unchanged amounts of water to the contractors (see Assumptions, above). We anticipate that continued application of Federal water to existing uses, without alteration of use, will not result in additional direct effects to listed species beyond those past effects described in the Environmental Baseline section, above. However, some conversion between different agricultural uses receiving unchanged deliveries of contract water could result in adverse impacts, or benefits, to listed species. For example, irrigated pastures have higher wildlife value for kit fox or vernal pool species than row crops or vineyards. Conversion of irrigated pastures to orchards may adversely affect these listed species without triggering Reclamation or District review. On the other hand, conversion of irrigated pasture to rice field would have a direct benefit to the giant garter snake by providing an artificial wetland ecosystem that meets the breeding and feeding needs of giant garter snakes. Reclamation's Land Use Mapping and Reporting Program, a long term conservation project committed under the Friant Opinion, will monitor the change in land use on an annual basis. However, Reclamation does not regulate change between agricultural uses. In the absence of opportunity to regulate changes in agricultural land uses in the contract areas, we assume that uses on lands already converted to agriculture as of this date within the districts will remain on average the same over the duration of this consultation. If the mapping program determines a significant change in land use, conservation measures will be evaluated by the Adaptive Management Committee.

The effect of continuing water diversions from the San Joaquin, Fresno, and Chowchilla Rivers in relation to the environmental baseline is complex. The baseline for Sacramento splittail, for example, is that habitat conditions have historically been greatly reduced above the junction with the Merced River, and continue to be so. In the absence of the proposed contracts, however, it is reasonable to expect that San Joaquin River flows would substantially increase and that habitat condition would improve to the point of allowing use of these river reaches by splittail for spawning, resulting in an increasing baseline. Thus a project/no project comparison indicates that splittail are adversely affected by the proposed contracts. However, we do not anticipate that continued diversions would directly result in further incremental declines in the species baseline.

Habitat conversion. A substantial threat to listed species populations remaining in the Friant service areas, including Buchanan and Hidden CVP Units, is continued conversion of useful habitats, to non-habitat or less useful habitats for specific wildlife species. Habitat conversions may in many cases occur as a result of, or be related to, federal water deliveries, since water supplies are limited and water is needed for agricultural and municipal and industrial developments in the semi-arid southern Central Valley. Although approximately 95 percent of the Chowchilla W.D. and Madera I.D. service areas is currently in row crops, orchards, urban development, or other developed uses, areas with important habitat values remain, both within and near the service areas (Appendix E). Table 4.1 summarizes land use within the proposed contract areas. We discuss these numbers with the understanding that some may be out of date; however the data are within the period covered by commitments for previous biological opinions (see Description of the Proposed Action, above).

Table 4.1. Acres and percent of land use within Chowchilla WD and Madera ID.

Land Use	Chowchilla W.D.		Madera I.D.	
	(acres)	(percent)	(acres)	(percent)
Orchard/Vineyard	27,289	31.97	92,912	71.16
Crop/Pasture	44,728	52.4	16,225	12.43
Grassland and Shrublands	4,844	5.67	6,097	4.67
Fallow	4,289	5.02	4,836	3.70
Urban/Mixed	883	1.03	6,490	4.97
Feedlot	1,232	1.44	480	0.37
Residential	868	1.02	584	0.44
Road and Utility R.O.W.s	423	0.50	766	0.59
Industrial	273	0.32	894	0.68
Commercial	364	0.43	669	0.51
Water	23	0.03	402	0.31
Upland Forest	66	0.08	133	0.10
Non-forested Wetland	82	0.10	66	0.05
Forested Wetland	0	0	10	0.01
Total Acreage	**85,364**		**130,564**	

According to the habitat data provided by Reclamation, there are or have recently been about 10,941 acres of rangelands (grazing lands, grassland, and shrublands) and 357 acres of other natural lands (not including water) within Chowchilla W.D. and Madera I.D. service areas. The rangelands make up about 5 percent of the total Service area. Conversions of rangelands to row crops would ultimately result in the loss of habitable area and important habitat functions. For example, vernal pools often co-exist with grazing lands since the morphology of the land is not disturbed. Conversion of grazing lands to orchards or row crops, however, would result in a loss of vernal pools, as agricultural practices associated with these crops often require discing of the land, which penetrates the hard underlaying substrate that supports vernal pool formations. Other listed species that may be adversely affected include the San Joaquin upland species, California red-legged frog, and California tiger salamander.

Vernal pools in California are associated with grasslands/rangelands in the Central Valley, where extensive agricultural and urban lands have been developed. Eight listed species identified in this biological opinion are found in vernal pool habitats. It is estimated that more than 75 percent of vernal pools have been lost in the Central Valley. Surrounding and within Chowchilla W.D. and Madera I.D., there were approximately 137,000 acres of vernal pool grasslands as of 1997. Between 1987 and 1997, 1,481 acres of vernal pool grasslands was converted within the service area. An additional 2,763 acres of vernal pool grassland immediately adjacent to the service areas were converted in the same period. The proposed action of providing water to Chowchilla W.D. and Madera I.D. service areas may adversely impact vernal pool species by (1) degrading habitat or converting habitat to non-habitat, (2) isolating individual vernal pools from their complex, and (3) degradation of vernal pools through activities in surrounding uplands. These and other effects are discussed below.

Continued agricultural and urban development in the affected area enabled by the delivery of Federal water may directly injure or kill listed species by filling or destroying remaining vernal pools. Habitat loss due to agricultural practices may occur at several levels, ranging from cattle grazing to orchard production. Cattle grazing, shallow discing and ditching would degrade vernal pool habitat; however, these areas may be restored and recovered to previous hydrological conditions. Deep-ripping of habitat associated with orchard production or row crop, however, disturb the impervious substrate, and may represent an irreversible conversion. Increased residential development and vineyard production are threatening the remaining vernal pool habitats that have traditionally been marginal agricultural lands.

Perhaps the habitat most impacted by water impoundment and diversion associated with CVP is riparian forest. We estimate that more than 95 percent of riparian habitat have been lost, with most of the remaining habitat degraded. In the Buchanan and Hidden CVP service areas, riparian habitat is limited to a narrow strip immediately downstream of the dams and a few small patches along the rivers (See Riparian land Use Corridor, Appendix E). In addition to providing a steady supply of water that enables agricultural and residential development, the regulation of flow and diversion of water interferes with riparian forest regeneration cycles, and reduces the amount of

area that is flooded annually. A more detailed analysis of impacts on riparian habitat is included under *water diversions* on page 4-18.

As detailed in the Project Description (Commitments for New and Continuing Actions), Reclamation and the Districts have proposed measures to minimize the conversion of habitats of listed species. We anticipate that these commitments will, among other things, restrict the delivery of Federal water that might allow conversion of remaining listed species habitats within the Districts, and restrict the annexation to the Districts of lands converted at least since 1995. Habitat conversions not in the purview of the Districts or Reclamation are addressed in the subsection below titled "Habitat conversions not addressed in the Project Description."

Habitat conversions not addressed in the Project Description. Certain habitat conversions likely to occur in the project vicinity appear to be outside the control of Reclamation or the contractors. Conversions inside the contract service areas that use groundwater and are not directly supplied with Federal water could continue unabated. Likewise, conversions outside the Districts that use groundwater and are within the zone materially affected by recharge from Federal water applications could continue, and are interrelated with the proposed contract deliveries. There may also be some use of tail-waters flowing off areas supplied by Federal deliveries, both in and below the contract service areas. Such interrelated but uncontrolled conversions are supported by the Federal action because they rely on groundwater recharge by Federal water. Even if the actual "Federal" water molecules have not yet reached their wells, recharge by Federal water can be responsible for the hydraulic head that makes sufficient quantities of water available to their pumps. The magnitude of uncontrolled conversions over the 25 year period of the contracts is extremely difficult to predict with precision. Based on recent trends, however, it is reasonable to expect that interrelated uncontrolled conversions will take place with detectable effects.

For example, we can roughly estimate future vernal pool habitat loss using Holland's data on recent trends, as detailed in the section on Environmental Baseline, above. As of 1997, there were 87,047 acres and 252,424 acres of remaining vernal pool habitat in Madera and Merced Counties, respectively. Using the historical trend of 11 percent loss in the ten year period between 1987 to 1997, we can roughly expect a 25 percent or 85,365 acres of loss in vernal pool grassland habitat in these two counties over the next 25 years. We anticipate that the commitments by Reclamation and applicants detailed in the Project Description will greatly reduce the amount of this conversion and loss directly attributable to uses of the proposed contract water, and work toward minimizing and partially offsetting the impacts of unauthorized losses since the 1991biological opinion. However, there may still be interrelated conversions not addressed by Reclamation and contractors based on groundwater recharge by federal water applications. We have not been able to quantify what proportion of groundwater-supplied conversions are interrelated effects as opposed to unrelated, cumulative effects. As a first approximation we assume that all groundwater-supplied conversions within contracting districts are interrelated, and all groundwater-supplied conversions within 2 miles of a contracting district are interrelated with the proposed action. Due to time constraints, Reclamation and ESRP were not able to provide a land use tabulation within the 2 miles of Chowchilla W.D. and Madera I.D.

for the purposes of this groundwater impact analysis. Below and in Table 4.2 is a description of land use for the entire Friant and Cross Valley Divisions. Maps of land use for Chowchilla WD and Madera ID are enclosed as Appendix E.

Table 4.2 details land uses outside but within two miles of Friant and Cross-Valley service areas, based on data and analysis provided by Reclamation that was in turn based on satellite imagery dating from 1993 to 1998 (Appendix E). Of the 2.5 million acres in this surrounding zone, 564,000 acres (23 percent of non-inundated area) are or have recently been in uses of moderate to high value to one or more listed species. Rangeland of various types (448,000 acres) accounts for most of the moderate to high value area. Considerable amounts of the area categorized as rangeland also support vernal pool ecosystems. Non-forested wetlands contribute 7,000 acres. Acreage of forest lands is mostly east and uphill, but downwind, from the project area.

We consider habitats of value to listed species within two miles of contracting districts to be vulnerable to two forms of habitat conversion resulting from federal water deliveries: (1) annexation into contracting districts; and (2) conversions supported by groundwater recharge. We assume that the Districts' commitment to prevent Federal water from being delivered to native lands converted since 1994 and the Reclamation's authority to review annexations will be effective in preventing conversion and annexation of listed species habitat or designated critical habitat without separate section 7 review pursuant to ESA. We anticipate conversions supported by groundwater recharge will follow recent trends as analyzed above, i.e., on the order of 10-20 percent loss of remaining habitats over the 25 year period. Some such conversions may undergo independent processes to comply with ESA, either section 7 or section 10. In addition, based on recent experience, we cannot ignore the likelihood that some interrelated conversions will take place without endangered species review or compliance.

Table 4.2 -- Land Use Within Two Miles of Friant or Cross-Valley Service Areas

GIS Code	LAND USE	Frequency (# of polygons)	AREA (acres)
LOWER HABITAT VALUE/CONVERTED AREAS:			
10	Urban or Built-up Land	14	1,443
11	Residential	218	25,397
12	Commercial and Services	297	25,161
13	Industrial	174	12,932
15	Industrial and Commercial Complexes	1	22
16	Mixed Urban or Built-up Land	724	120,344
17	Other Built-up Land	320	14,914
18	Urban landscaped areas	97	5,180
21	Cropland and Pasture	1675	794,217
23	Confined Feeding Operations	484	18,598
Subtotal:			1,018,208
VARIABLE VALUE--SUBSTANTIAL TO LOW :			
14	Transportation; Communications and Utilities	78	10,652
19	Urban vacant; unpaved	1	129
22	Orchards; Groves; Vineyards;	1159	848,567
26	New lands being prepared for crop production	4	309
70	Barren Land	2	398
75	Strip Mines; Quarries; and Gravel Pits	5	447
76	Transitional Areas	4	447
77	Mixed Barren Land	1	376
Subtotal:			861,326
MODERATE TO HIGH HABITAT VALUE:			
25	Idle farmland	405	29,557
30	Rangeland	1060	178,431
31	Rangeland, Herbaceous	257	260,025
32	Rangeland, Shrub and Brush	19	9,271
41	Deciduous Forest Land	63	61,482
42	Evergreen Forest Land	2	17,078
61	Forested Wetlands	21	1,028
62	Nonforested Wetlands	102	7,007
73	Sandy Areas other than Beaches	2	487
Subtotal:			564,364
TOTAL non-water area:			2,443,898
WATER:			
50, 53, 55	Water, Reservoirs	205	20,584

Some examples of unconsulted conversions with documented or likely effects on listed species in and around the proposed contract areas have come to our attention. A few of these are briefly summarized below.

Lower Tule ID Destruction of Valley Elderberry Longhorn Beetle Habitat -- In February of 2000, this district re-contoured the bed of the Tule River over a distance of about 10 miles, from Porterville downstream. The district used bulldozers and other heavy equipment to remove all vegetation from the bottom and sides of the channel, and to shape the channel into a uniform cross-section. This action occurred in an area supporting elderberry shrubs and documented to support the threatened beetle. Local volunteers who helped mark shrubs before the re-contouring estimated that several hundred elderberry bushes had been destroyed. This work was conducted without incidental take authorization from the Service, and reportedly without Clean Water Act permits. The effects have not been compensated to date. The district stated that it conducted a similar operation in 1999 on the 10 miles of the riverbed below the section impacted in 2000. The Service considers these actions interrelated with Reclamation's action, since they were performed by one of the contracting districts, which likely would not exist without federal water deliveries. We have no information that allows us to estimate the extent of future similar interrelated actions by this and other districts.

Alpaugh ID, Conversion of Adjacent Lands – In the last half of 1999 or early 2000, approximately 800 acres of natural habitat used by blunt-nosed leopard lizards, kit fox, and perhaps other listed species was plowed and disced. The converted land was adjacent to the North Pintail Slough, a multi-partner project with both agricultural and waterfowl objectives, which connects to Alpaugh facilities. The adjacent landowner(s) appear to have converted the land in anticipation of new availability of water. This conversion took place without an incidental take permit and the effects have not been compensated to date. The area converted was identified in the Upland Species Recovery Plan as an important linkage area for listed species and a priority habitat protection area for blunt-nosed leopard lizards.

Holland data – We examined Holland's (1998) GIS mapping of the Central Valley, which showed remaining vernal pool habitats based on July 1997 aerial photos as well as areas converted from habitat since previous photos taken at dates in 1987. In the ten years from 1987 to 1997, Holland found that 1,481 acres of habitat was converted within Chowchilla W.D. and Madera I.D. contract service areas. In Fact, Chowchilla W.D. and Madera I.D. accounted for the majority of vernal pool habitat losses in the Friant Division service areas. There was also vernal pool habitat destruction outside mapped district boundaries, often directly adjacent to district lands. For example, 2,763 acres were converted immediately adjacent to Chowhcilla WD and Madera ID. An unknown portion of these conversions may have taken place prior to the listing of four vernal pool crustacean species in 1994. However, this habitat is also used by the kit fox, which has been protected since 1967.

Post-Holland data – Illegal and unreported destruction of vernal pool grasslands poses a significant threat to the vernal pool crustaceans. There are large areas of vernal pool habitats that have been converted without authorization from Reclamation or the Service. Based on Holland (1998) and conversions known to the Service, we estimate that more than 8,000 acres of vernal pool grasslands in Madera and Merced counties have been converted without incidental take authorization from 1997-1999. Conversions unknown to us would probably increase this figure substantially. Such conversions are likely to occur in the future given the shortage of personnel in the Service and the Corps to detect and enforce violations. A recent Supreme Court ruling limiting the authority of the Corps to review isolated wetlands is likely to increase the amount of unreported destruction of vernal pool habitats harboring listed vernal pool species.

Many unauthorized conversions may be outside the jurisdiction of Reclamation or the Districts; however, a few are at least within the boundaries of the contract service areas. For example, in 1997, 456 acres of vernal pool habitat in the Chowchilla WD was converted without authorization. This converted land was annexed by Chowchilla Water District, and Reclamation subsequently consulted on this conversion as they had committed not to deliver water to lands converted after 1994. There are likely more conversions within the project area that the Service is not aware of.

In summary, there is a historical baseline of habitat conversions either in ignorance or evasion of listed species protection requirements, and lack of knowledge of prior commitments by Reclamation, the Districts, or individual landowners. It is reasonably likely that such conversions will continue at a detectable rate, both within and in the vicinity of the contract service areas.

Habitat fragmentation. Habitat conversions also can fragment remaining habitat and break habitat connectivity needed to preserve dispersal. Dispersal promotes gene flow and metapopulation interchange among different portions of a species range. Loss of habitat area or gene flow and population interchange may reduce the likelihood of survival and recovery of listed species.

For example, the Upland Species Recovery Plan identifies the area along either side of Sandy Mush Road (in Merced County north of Routes 33 and 152) and in the vicinity of the Chowchilla River, in Merced and Fresno Counties east of Highway 99 (narrow down), as an essential linkage or connectivity area for the kit fox (Service 1998). There are large areas of grassland, seasonal wetlands, and "idle" or fallow lands along this corridor that make it especially suitable for kit fox dispersal, connecting populations on the east and west edges of the Central Valley. Mapping indicates that northern portions of the Chowchilla WD include some suitable habitats along this corridor, and lands adjacent to Chowchilla WD and Madera ID are vital to the kit fox for habitat and connectivity values. The preservation of a corridor in this area is essential to the continued survival and recovery of the kit fox (SERVICE 1998). The Service is aware of unrelated proposals to convert habitat to non-habitat along Sandy Mush Road. Habitat conversion along Sandy Mush Road or in other areas may threaten the continued existence of the kit fox.

The conversion of vernal pool habitats may fragment complexes, and isolating vernal pools. Individual pools within a vernal pool complex are mutually interdependent in supporting listed vernal pool species; when a species is extirpated from an individual pool, other pools in the complex may serve as re-colonization sources. The fragmentation of complexes makes listed species vulnerable to loss of genetic variability and related problems of inbreeding and genetic drift, demographic fluctuations due to random variations in birth and death rates, and environmental fluctuations due to variation in predation, competition, disease, food supply, and natural catastrophes (Primack 1998). Fragmentation of vernal pool complexes may threaten the survival and recovery of listed vernal pool species.

These examples highlight common effects of habitat fragmentation on species populations. Such effects apply generally to many species, and we consider that habitat conversions that fragment and reduce the connectivity between remaining pieces of habitat are likely to have such effects on any listed species that use the habitat.

The Upland Species Recovery Plan identifies several target areas for listed species habitat connectivity or linkage. Identified linkage areas relevant to the proposed contracts include but are not limited to:

- linking national wildlife refuges in Merced County to natural areas in Madera and Fresno Counties along Sandy Mush Road (discussed above)
- enhancing habitat values along Chowchilla Canal to link grassland areas and protected lands.
- western Madera County, and northwestern Fresno County southwest of Tranquility
- any area between remnant riparian habitat in Stanislaus, San Joaquin, Merced, Madera, and Fresno Counties.

Important habitat areas for focal species. Here we briefly highlight the importance of particular areas of remaining habitat to some of the species in this biological opinion. Habitat loss or degradation due to conversion in these areas would measurably degrade the conservation status of the species. Further effects of habitat conversion are considered in the Cumulative Effects section, below.

Aleutian Canada goose – This bird winters in the San Joaquin Valley. The Aleutian Canada Goose Recovery Plan (SERVICE 1991) estimates that 25,000 to 35,000 acres of migration and wintering habitat will be needed. Wintering and migratory areas are being studied at this time to determine appropriate areas for conservation.

Giant garter snake – This species occur in aquatic habitats and adjacent lands, including open water, freshwater marshes, rice paddies, and grassland areas up to 250 meters (820 feet) from the edge of aquatic habitat. Lands to the west of Madera I.D. and Chowhcilla W.D. and along the Chowchilla canal are identified by the Giant Garter Snake Recovery Plan as priority lands for protection and restoration (Task # 1.1.11 and 1.1.12).

Hartweg's golden sunburst – This endangered annual plant, a member of the sunflower family, occurs on grasslands and in the margins of oak woodlands of the southern Sacramento and San Joaquin Valleys. Hartweg's golden sunburst populations are clustered primarily in two regions of the Central Valley. The southernmost group of populations occurs within or adjacent to the Madera and Fresno Irrigation Districts. Little is known about the pollination ecology of this species; however, protection of native pollinators in surrounding grasslands is recommended. Hartweg's golden sunburst is sometimes associated with the Amador and Rocklin soil series, which are characterized by a series of low mounds interspersed with shallow basins that may pond water during the rainy season. Hartweg's golden sunburst tends to occur on the north- or northeast-facing slopes of the mounds, with the highest plant densities on upper slopes.

Palmate-bracted bird's-beak – This species occurs in valley and foothill grasslands and scrub near and possibly within the Madera Irrigation District. The primary pollinators of the species are bumblebees which nest in uplands up to a kilometer (0.6 mile) or more from the plants. The pollinators may also be affected by conversion or annexation of this area which may result in reduced bird's-beak pollination and seed production. The bird's-beak co-occurs in western Madera County with several listed animal species. The Upland Species Recovery Plan identifies protection of the Madera County populations as important for recovery of the species.

Riparian brush rabbit and riparian woodrat – These species occur in riparian forest in the Central Valley that has been largely destroyed or degraded in the past 50 years. Restricted to only one and two populations, respectively, these species are highly vulnerable to extinction. The Upland Species Recovery Plan identifies reconnection of fragmented riparian habitat as an important component of conservation. Due to the limited distribution of these species, reintroduction of the species into improved or restored habitats may be needed.

Blunt-nosed leopard lizard – Broadly distributed but uncommon in most localities, this endangered lizard may occur in grassland, rangeland or scrub within or near almost any of the service areas below 2,600 feet in elevation. Often co-occurs with San Joaquin kit fox. The Upland Species Recovery Plan explicitly calls for protection and beneficial management of habitats of the species in western Madera County (vicinity of Madera and Gravelly Ford districts) and 6,000 acres in the Pixley-Allensworth area, Tulare, Kern and Kings counties (vicinity of Alpaugh, Atwell Island, Pixley, Southern San Joaquin, and Delano-Earlimart districts).

Fresno kangaroo rat and designated critical habitat – Any remaining populations yet to be discovered of this critically endangered species will be crucial to its survival and recovery. Potential habitat for the species may occur within and adjacent to the western portions of the Fresno, Madera, Chowchilla, Lower Tule River, and Tulare IDs and northern portions of Gravelly Ford ID. The Upland Species Recovery Plan gives high priority to surveying a block of potential habitat west of and possibly partially within Madera and Gravelly Ford IDs. Critical habitat designated for the species lies about 7 miles west of Fresno ID. Appropriate habitat management of protected lands for Fresno

kangaroo rat survival is also urgently needed. Lack of vegetation management on some preserved lands likely contributed to the species' decline.

San Joaquin kit fox – The species occurs in scrub, grassland, rangeland, and some agricultural land throughout the Friant and Cross Valley Service Areas. The Upland Species Recovery Plan explicitly calls for protection and beneficial management of habitats for the species in several locations within the Friant and Cross Valley Service Areas. Two satellite populations require protection: the population in Western Madera County and Merced County; and the southeast Valley floor in Tulare and Kern Counties, including the Pixley-Allensworth area. Corridors between these satellite populations and other populations must be maintained. One corridor runs north-south on the east side of the San Joaquin Valley from Arvin-Edison WSD to north of the Friant and Cross Valley Service Areas. The Chowchilla Canal Linkage, the Sandy Mush Road Linkage, and the Western Fresno County Linkage run across portions of the Gravelly Ford WD, and the Madera ID. The Highway 43 Linkage in Tulare County runs between the Kern County border at the Allensworth Natural Area to public land directly west of Tiptoe, within the Lower Tule River ID, and Pixley ID. The Paso Creek and Graces Highway Linkages from Highway 66 to the Kern NCR run across the Alpaugh ID and the South San Joaquin MUD.

Vernal pool species include Calisaya grass, Conservancy fairy shrimp, fleshy owl's clover, Greene's Tectaria, hairy Arcade grass, San Joaquin Valley Arcade grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp. Since the fate of most of these species are strongly tied to the loss or degradation of vernal pool grasslands in the San Joaquin Valley, we lump strategies for conserving these species together under habitat-based objectives. These conservation measures include: (1) permanently protecting and managing substantial area of vernal pool complexes, including large, high quality complexes that can sustain large populations, (2) protecting habitats across a wide geographic range, and (3) protecting habitats belonging to a range of vernal pool ecosystem types. The protection of larger complexes will ensure preservation of ecosystem level processes important to species survival, and will protect species from local extinction. Protection distributed across geographic regions and vernal pool types will preserve genetically and ecologically distinct populations, and buffer the species against catastrophic events.

There are numerous opportunities to protect vernal pool habitats within the Chowchilla WD and Madera ID service areas. Madera and Merced counties, where the service areas are located, make up approximately 80 percent of vernal pool habitats in the San Joaquin Valley, and 34 percent in California (Holland 1997). Madera and Merced County also contain some of the largest intact complexes in California. Relatively little vernal pool habitat for listed species currently is protected within or near these CVP service areas. Protection efforts for vernal pools should focus first on vernal pool habitats in the southeastern corner of Merced County near the Chowchilla WD, along the Madera Canal in Madera County, and west of and possibly within portions of the Madera ID/north of Gravelly Ford ID in western Madera County. As previously identified in the Friant and Cross Valley consultation (1-1-01-F-0027), habitats along the Friant-Kern Canal in and

near the northeast portion of the Fresno ID, and southwestern Tulare County including Pixley ID should also be protected. Western Madera County and Tulare County may have relatively uncommon low terrace pools whose protection would contribute to the diversity of vernal pool ecosystem types preserved.

Pesticide use. An interrelated effect of Federal water deliveries to the Friant contractors, including Madera ID and Chowchilla WD contractors is the use of pesticides, including insecticides, acaricides, herbicides, fungicides, and other chemicals, on crops grown benefitting from Federal water. Reclamation does not control pesticide use, but the Service must consider all interrelated and interdependent effects. Fresno, Kern, Tulare, and Madera counties, the principal counties of Friant Division and Cross-Valley Unit CVP deliveries, rank 1, 2, 3, and 6 statewide, respectively, in total pesticide applications. Cumulatively, 87 million pounds of pesticides (active ingredients) were applied within these four counties in 1999 (California Department of Pesticide Regulation).

A recent study by the U. S. Geological Survey (USGS) suggested organophosphate pesticides from southern Central Valley agricultural areas are contributing to the decline of amphibian populations in the Sierra Nevada. These pesticides kill pests by inhibiting cholinesterase, a vital cellular enzyme in all animals. The USGS scientists found pesticide residues (chlorpyrifos and diazinon) in adults and tadpoles and reduced cholinesterase activity in tadpoles of Pacific tree frog from several Sierra locations, and that cholinesterase activity was significantly lower in the mountains east of the San Joaquin Valley compared with similar sites farther north and east of the Sacramento Valley, where agricultural activity is less extensive. They also found that cholinesterase activity decreased from coastal populations eastward to the mountains.

The only federally listed amphibian that may occur down prevailing winds from the Friant and Cross-Valley Division service areas is the California red-legged frog. Red-legged frogs may still occur in isolated populations in the hills east of the contract service areas. A sighting of the species was reported in 1988 near Glennville (northern Kern County). There is no proposed critical habitat for the species in the area, and the draft recovery plan for the species does not identify essential habitat or populations in the area. Since listing of the species in 1996, three previously unknown populations have been found in the Sierra Nevada, due to increased attention and surveys. The Service considers it reasonably likely that one or more populations of red-legged frogs exist downwind of the proposed service areas. No evidence concerning effects of agricultural pesticides on such populations is available.

Other, non-listed amphibians of concern occur in the Sierra Nevada above the proposed contracts vicinity. Mountain yellow-legged frog and Yosemite toad occur there and we have found that there is substantial information supporting the need to list these species as threatened or endangered (65 FR 60603, 65 FR 60607). The California tiger salamander, a candidate species, occurs at lower elevations in the contracts vicinity. The USGS study is cause for concern about the effects of pesticides on the tiger salamander, mountain yellow-legged frog and Yosemite toad. No studies specific to the effects of pesticides on these species in the contracts vicinity are yet available. At present we have no information concerning effects of Central Valley pesticide use on other listed vertebrates or plants found in the Sierra Nevada, such as the bald eagle.

When surface water flows from the Buchanan and Hidden CVP Unit areas reach the lower San Joaquin River and the Sacramento-San Joaquin Delta (Delta), they have potential to contribute to pesticide contamination of waters inhabited by delta smelt and Sacramento splittail. For example, the San Joaquin River and the Delta have been designated impaired water bodies by the EPA for chlorpyrifos and diazinon, two general-use organophosphate pesticides that are very widely applied, and for "Group A pesticides" and "unknown toxicity". Preliminary data for 1999 indicate that a total of 800,000 pounds of chlorpyrifos and 190,000 pounds of diazinon (active ingredients) was used on orchards, row crops, vineyards, and other uses in Fresno, Kern, Madera and Tulare counties (California Department of Pesticide Regulation data). The Delta is designated critical habitat for the delta smelt.

We believe that any contamination of the Chowchilla and Fresno Rivers is not likely to greatly contribute to the contamination of the Delta as all water from the Chowchilla and Fresno Rivers are diverted for agricultural uses in most years. Only in extreme flood years do water reach San Joaquin River. More serious impacts to Sacramento splittail and other anadromous fish species resulting from the proposed project include restriction of access to spawning habitat in the Chowchilla and Fresno Rivers. The reduction in surface flow to the San Joaquin River also compounds the contamination problems in lower San Joaquin River and the Delta by reducing the fresh water volume that reaches the San Joaquin River and Delta, thus concentrating contaminants. It is believed that the poor water quality is limiting the splittail's use of the San Joaquin River as spawning habitat as they move upstream in only years of high flow (SERVICE 1996).

Without Federal water deliveries, some farm operations in the area would halt and pesticide use would likely decline. Reclamation memorandum MP-405, ENV-4.00 dated April 29, 1991, estimated that approximately 90 percent of acreage within the Friant service area would go out of agricultural production without contract deliveries. Because of within- and outside-service area effects on groundwater recharge and groundwater levels, it is likely that Federal water deliveries support agriculture on considerably greater acreage than this. While the information is not readily available for Chowchilla WD and Madera ID, if we assume that 90 percent of acreage inside Friant Division service areas and 10 percent of acreage within 2 miles of the service areas would go out of production without this Federal water, this corresponds to 1.4 million acres for the Friant Division service area, with a corresponding drop in agricultural pesticide use.

All of the vertebrate species except the tiger salamander mentioned in this section on pesticide effects would have to be impacted by pesticide transport at considerable distance from the target sites of pesticide applications. Tiger salamanders, a candidate species, live closer to application areas and may sometimes be within target areas, e.g. of rangeland applications.

Valley elderberry longhorn beetles also live in close proximity to areas of agricultural pesticide application associated with contract water deliveries. Halstead (Barr 1991) documented areas of valley elderberry longhorn beetle habitat along the Chowchilla and Fresno Rivers watershed. In his reconnaissance, he found an adult beetle, which are rarely seen, along the Fresno River, and found characteristic exit holes--strong evidence of occupation--at other sites. The species may also occur in other, unsurveyed areas where elderberry shrubs exist.

The beetle and its host plant may be impacted through the application of pesticides used for crop, orchard, vineyard, and rangeland control of insects and weeds. The majority of pesticides used to control insects or mites would adversely affect individuals of the beetle that came in contact with them, through mortality, impaired development, reduced reproductive success, or disruption of normal behavior. Because the beetle often lives in patches of habitat that are narrowly linear and/or small along riparian corridors, it is especially vulnerable to pesticide application or drift from adjacent uses, such as applications to agricultural fields. The range of the species is scattered throughout the great Central Valley of California, one of the most productive agricultural areas of the world. While it would be unlikely that any one pesticide in any one year would completely wipe out all of the populations--or even any one population--of the beetle, the repeated use of pesticides over many years is likely to contribute to progressive reduction and extirpation of populations of the beetle over its range. In 1995, the following chemicals were reported to be used within the same section (square mile) as beetle localities: acephate, aldicarb, azinphos-methyl, carbofuran, chlorpyrifos, endosulfan, naled, parathion, permethrin, S-fenvalerate, and trifluralin. Valley elderberry longhorn beetle locations existed within the same section as more than 60 common crops or uses of pesticides, including vegetable crops, grains and seed crops, vineyards, fruit and nut orchards, forage crops, cotton, pastures, rangeland, nurseries, turf, and uncultivated areas (University of California Statewide Integrated Pest Management Project: SFWO 1999 national pesticide consultation files). Habitat of the beetle also commonly contains or occurs adjacent to seasonal or permanent wetlands and may be targeted for mosquito control. The Service has previously recommended a finding of jeopardy to the valley elderberry longhorn beetle for the registration of five pesticides consulted on by the EPA that are used in the four-county area (Fresno, Kern, Tulare and Madera): acephate, chlorpyrifos, naled, permethrin, and esfenvalerate (S-fenvalerate). Acephate and permethrin are heavily used in the four-county area, and esfenvalerate is commonly used. Naled is heavily used on cotton in Fresno County, and is moderately used elsewhere. Many other pesticides in common usage in the area--some of them related in their mode of action and effects to the five above--have never been consulted on by EPA or fully evaluated by the Service.

The beetle would be most vulnerable to pesticides from March 1 through June 30, when adults, eggs, and first instar larvae could be exposed outside of the elderberry pith. This is also a high period of growth and activity for many crops and pest species, demanding pesticide use. During the remainder of the year, valley elderberry longhorn beetle larvae and pupae would be inside elderberry stems and relatively protected, although feeding larvae might be vulnerable to plant-systemic pesticides.

Additionally, the beetle may be indirectly affected by herbicides affecting their host elderberry shrubs, and lethal or sublethal effects of pesticide use on some pollinators of elderberry shrubs. Such effects could be mediated through reduced survival, growth, or seed production resulting in lowered availability of elderberry shrubs as food for the beetle. However, the guild of elderberry pollinators is large and the plants are self-compatible, so pollinator-mediated effects are judged to be undetectable. Herbicide usage likely affects some beetles but habitat conversion and vegetation clearing are predominantly responsible for losses of host plant availability.

Vernal pool species are highly sensitive to chemistry of their habitats. Since the primary source of water in a vernal pool is precipitation and runoff, many of the organisms endemic to vernal pools are exposed to a wide variety of potentially toxic chemicals during their short (less than 6 months) life cycles. Pesticide use in nearby lands can sheet flow or drift to vernal pools. The ephemeral nature of vernal pools may enhance concentrations of such chemicals during the dry-down phase in late spring. In addition, some compounds do not degrade in a season, resulting in long term accumulation (Cahill et al, 2000). Ultimately, the deposition and concentration of agrochemicals in vernal pools may represent a serious risk to the resident threatened and endangered species.

Contamination of vernal pools from adjacent areas may injure or kill vernal pool crustaceans. Toxic chemicals, such as petroleum products, pesticides, fertilizers, and herbicides, may enter into vernal pool habitats. In San Joaquin Valley, broad spectrum pesticides and herbicides are commonly used for both agricultural and residential purposes to control a diverse array of pests and noxious weeds (see discussion above). Some pesticides, such as the commonly applied organophosphates diazinon and chlorpyrifos remain or volatize in the atmosphere and are transported and redeposited throughout the region. Several studies have demonstrated that potentially toxic diazinon levels exist, travel in, and deposit out of mist and rain droplets.

Effects of pesticide use on listed species unrelated to the contract water deliveries are considered in the Cumulative Effects section, below.

Fertilizers. The Delta has been designated as an impaired water body by the EPA for organic enrichment and dissolved oxygen. Much of this excess organic loading and oxygen depletion results from fertilizers applied to agricultural lands in watersheds running into the Delta, sometimes including portions of the proposed contract service areas. Fertilizer applications in the contract service areas and in areas of agriculture supported by groundwater recharge from Federal water deliveries is interrelated with the proposed contracts, because in the absence of contract deliveries it is likely that acreage in agricultural production would decline by approximately 90 percent (see above), with a corresponding decline in fertilizer applications.

Nutrients from fertilizers may have a variety of effects in aquatic ecosystems, including algal blooms, increased biological oxygen demand (sometimes to the extent of anoxic conditions), and altered planktonic, benthic, and fish communities. The effects need not be uniformly negative; for example, a fish like the delta smelt that eats algae could benefit from increased algal productivity. Such hypothetical benefits have not been demonstrated for the smelt, and must bear the caveat that blooms of inedible or toxic algal species or blooms that alter water chemistry or aquatic communities can have direct or indirect adverse effects even on herbivorous fish. Effects of organic loading on a benthic-feeding species like Sacramento splittail are similarly ambiguous in the absence of focused studies. Dissolved oxygen depletion is likely to have negative effects on both species. We cannot quantify at this time the degree to which fertilizer applications interrelated with Federal water deliveries contribute to modification of the Delta and other listed fish habitat.

Fertilizers can directly adversely affect amphibians such as the California tiger salamander, a candidate species. Runoff into ponds or direct application to ponds or upland areas where salamanders are active may result in mortality and sub-lethal effects (Schneeweiss and Schneeweiss 1997).

Fertilizer input can lead to eutrophication of vernal pools, which can kill vernal pools species by reducing the concentration of dissolved oxygen (Rogers 1998).

An additional effect of fertilizer is the application of *toxic chemicals in fertilizers*. For the last few decades, fertilizer manufacturers routinely have been adding undisclosed amounts of toxic waste to farm and home fertilizers sold in California. These companies buy toxic waste from industrial facilities to obtain low-cost plant nutrients, such as zinc or iron. However, sources of these low-cost plant nutrients are often highly contaminated with persistent toxic chemicals, including heavy metals and dioxins. More than 1/6th of the commercial fertilizers tested by the California Department of Food and Agriculture between 1994 and 1998 (n=250) exceeded State of California hazardous waste criteria for heavy metals including lead, arsenic and cadmium. Mercury was also a common contaminant. Tests of a widely used home fertilizer sold throughout California (Ironite) uniformly exceeded State of California criteria for classification as hazardous waste (Kaplan et al., 1999).

Between 1990 and 1995, California fertilizer makers and farms received nearly 38 million pounds of toxic waste, making California the U.S. state importing the most toxic waste. Fertilizer manufacturers use smokestack ash from steel mills, air pollution scrubber brine and other industrial byproducts as the raw materials for a substantial portion of the nation's fertilizers. The resulting waste-derived fertilizers typically contain high levels of toxic materials, such as dioxin and heavy metals (EWG/CALPIRG 1998).

According to a risk assessment commissioned by the California Department of Food and Agriculture, the regular use of contaminated fertilizers will dramatically increase levels of heavy metals in farm soil (Foster and Wheeler, 1998). Because heavy metals are elements and cannot biodegrade, and dioxins are extremely resistant to decomposition, repeated dispersal of these contaminants in fertilizers onto farm fields ultimately is likely to lead to accumulation of much higher levels of contamination than result from a single application. At present, fertilizers are exempted from many legal requirements relating to toxic wastes, and there is no way a buyer of fertilizer can know the amounts of the toxic ingredients because fertilizer labeling requirements do not require disclosure of toxic ingredients.

It is unknown what the effect of repeated application of fertilizers containing hazardous waste levels of heavy metals and other contaminants will have on listed species. However, some adverse environmental effects appear likely to species living on the lands receiving these fertilizer applications, adjacent lands, and waterways receiving runoff from these lands. At present, for example, we are aware that increased levels of mercury would be of particular concern for species that may be exposed, including aquatic species. We are not currently aware of any focused studies of such effects.

Other effects. Many activities associated with agricultural practices of housing development can directly or indirectly impact listed species. For example, Vernal pools may be degraded by farming or development activities that occur in, adjacent to, or near the contract service areas. Upland activities that may disturb vernal pools include, but are not limited to, trenching, grading, scraping, off-road vehicles, over-stocking of livestock, discing, plowing, and deep-ripping. These construction or cultivation activities may cause erosion and siltation of vernal pools. Water diversions, ditching, draining , or irrigation can divert water from or to vernal pools, changing the depth and duration of innundation and potentially the temperature and water chemistry of the pool. Such changes are likely to interfere with vernal pool species reproductive cycles, because their biology is precisely adapted to ambient hydrological, physical, and chemical conditions and cues. Construction of roads near vernal pools may disrupt hydrology or increase runoff of sediments and contaminants.

Habitats of other listed species may similarly be degraded by discing, grading, off-road vehicle use, and other activities often associated with and occurring near urban and agricultural land uses. Additionally, ground disturbing activities and human presence may harass listed species and interfere with their normal feeding, breeding, or resting behavior.

Water Diversions. In stream flow below Hidden and Buchanan Dams are controlled by the Corps of Engineers through releases from the Dams. Water is released from Hensley and Eastman Lake as needed by the water user, usually from May to October. Historically, all stored water expect that reserved for dead pool storage, a recreational easement, and that necessary to meet riparian water rights is delivered to CVP contract water users for irrigation and other purposes. The amount of water delivered to the contractors vary annually with the amount of rainfall and capacity of water storage (Reclamation 2001). From 1990 to 1997, the annual delivery to the contract water users averaged 36,837 acre-feet for Buchanan Unit, and ranged from 10,000 acre feet to 90,000 acre feet. Water deliveries for the Hidden Unit for the same period averaged 32,804 acre-feet, and ranged from 10,000 acre-feet to 50,000 acre-feet. The amount of water released downstream of the Dams have not significantly changed from historical amounts (pre-dam construction). However, the impoundment and delivery of CVP water has improved the supply and reliability of the water for agricultural uses; thus facilitating the conversion and loss of native lands.

The impoundment and diversion of water associated with delivery of CVP waters has contributed to the loss of riparian habitat by facilitating habitat conversion and degrading riparian habitats. The impoundment of the water above the dams captures heavy winter and spring run-off; releasing water only to avert a flood situation. The water is then allowed to fill to maximum capacity, and is released slowly as is needed by the contractors. This change in timing of water flow interferes with natural processes that affect riparian forest regeneration. Controlled water release reduces mid-successional habitat (dominated by brush and young to middle-aged trees) by removing the disturbance agent (flood) from the ecological process. This controlled release and water diversion from the rivers also has restricted the extent of the river bank that is flooded annually; thus contributing to the loss the riparian habitat and facilitating development along the river.

With the renewal of the water contracts for the next 25 years, in-stream flows would continue to be regulated, enabling development and conversion of the remaining riparian habitat within the reach of the Chowchilla and Fresno Rivers from either dam to the Chowchilla WD and Madera ID. Development for residential or industrial purposes would constitute an irreversible loss as it is nearly impossible to restore river flow once human development occurs in the flood plain. It is estimated that almost 95 percent of riparian habitat in the San Joaquin Valley has been lost by the mid-1980's, with much of the remaining riparian habitat degraded and non-contiguous. This acreage is likely to be much less today (Service 1998).

Listed and candidate species associated with riparian habitats in the San Joaquin Valley include: giant garter snake, riparian brush rabbit, riparian woodrat, and valley elderberry longhorn beetle. The giant garter snake and valley elderberry longhorn beetle are widely but sparsely distributed throughout the valley. Although the lost of additional riparian habitat along Chowchilla and Fresno Rivers would adversely impact these species, it would not jeopardize their recovery. There is only one known population of riparian brush rabbit, and two known populations of riparian woodrat remaining in the world. The limited distribution of these species makes them extremely vulnerable to random natural events, such as flood, drought, or fire. The Recovery Plan has identified protection of additional riparian habitat and reestablishment of additional populations the highest priority for recovery (Service 1998).

There are no known populations of riparian brush rabbit or riparian woodrat in the Chowchilla WD and Madera ID contract service areas; thus the proposed action would not have any additional adverse impact on these species. However, riparian habitats within the contract service areas are within the historical range of both species, and an opportunity exists to protect and restore riparian habitat along these rivers for the benefit of these species. As part of the long-term conservation efforts associated with CVP, Reclamation has initiated a feasibility study to reintroduce the riparian brush rabbit to federally owned land on Kings River. Reclamation has committed to research other opportunities within the Friant and Cross Valley service areas for riparian habitat restoration and reintroduction of riparian brush rabbit. We assume that this commitment extends to Federal and District lands adjacent to the Chowchilla and Fresno Rivers. Reclamation has also committed to working with Service to implement recovery objectives identified in the Upland Species Recovery Plan. For the riparian brush rabbit and woodrat, the recovery plan identifies conservation of existing riparian habitats, and development of an outreach and incentive program for the protection and restoration of riparian habitat on private lands.

The renewal of contracts could also adversely impact the Sacramento splittail and the delta smelt. The decline of these species is largely attributed to the Central Valley Project and the State Water Project (Service 1996). The Sacramento splittail is a freshwater species that historically occurred in San Joaquin and Sacramento Rivers and the Delta. The delta smelt is an estuary species found in the Delta. There have been records of Sacramento splittail spawning in the Chowchilla and Fresno Rivers. The diversion of water from these rivers, and bypass of water through the Chowchilla Canal has resulted in a direct loss of spawning habitat for the Sacramento splittail. Additionally, the diversion of water associated with CVP has reduced water flow and increased the salinity of Delta, ultimately reducing the amount of spawning habitat for both species in the

Delta. As the splittail and the Delta smelt no longer spawn in Chowchilla or Fresno Rivers, the long term renewal of the Buchanan and Hidden CVP Units would not have an additional adverse impacts above the existing baseline. However, the continued diversion of water for CVP purposes will decelerate the long term recovery of these species, when compared to non-renewal of these contracts. Commitments made by Reclamation in the section 7 consultation on long term operation of CVP and SWP (1-1-94-F-70) to provide base flow to the San Joaquin River will reduce the impacts of CVP. This commitments, combined with full implementation of the Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes, should allow the eventual recovery of these species

Effects of Conservation Measures/Commitments. These measures or commitments are intended to reduce, ameliorate, or reverse effects of the long term renewal of Buchanan and Hidden CVP contracts, including water diversions and deliveries, on listed and proposed species. In our effects analysis we have assumed that these measures will be effective. The measures also establish an Adaptive Management committee to address any unforeseen inadequacies or failures of the conservation measures.

Cumulative Effects

Cumulative effects are those effects of future State, local, or private actions on endangered and threatened species or critical habitat that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Numerous activities continue to eliminate habitat for listed and proposed threatened and endangered species in the Central Valley. Habitat loss and degradation affecting both animals and plants continues as a result of urbanization, oil and gas development, road and utility right-of-way management, flood control projects, overgrazing by livestock, and continuing agricultural expansion. Listed and proposed animal species are also affected by poisoning, shooting, increased predation associated with human development, and reduction of food sources. All of these nonfederal activities are expected to continue to adversely affect listed and proposed species in the Central Valley.

Cumulative effects on many species are severe enough to substantially reduce the likelihood of long-term survival and recovery of these species. Ongoing operation of the CVP, including the Friant and Cross-Valley contracts, contributes to the threat to these species. Reclamation's ESA compliance strategy is intended to minimize further losses within the CVP service areas and to offset impacts from ongoing CVP operations.

Many of the effects discussed above as indirect or interrelated effects also occur unrelated to the proposed action, and are considered in the category of cumulative effects. An example is pesticide use in the vicinity of the contract service areas but not dependent on the contracts. Most pesticides have not been consulted on with the Service by EPA. Modes of pesticide effects on listed species were discussed above. Pesticides of all types, including herbicides, are extremely widely used in California, particularly in the San Joaquin Valley. Chemicals applied

nearby may drift or run off into contact with listed species. Certain pesticides are registered by the EPA for use on rangelands, and these may be sprayed directly on vernal pools, tiger salamander habitat, and upland species habitat. Pesticides are sometimes applied directly to pools, including vernal pools, for mosquito abatement.

A particular example of a cumulative effect of pesticide use that is relatively new to the area is glassy-winged sharpshooter control. Elderberry shrubs, the food and host plant of the valley elderberry longhorn beetle, has been identified as a refuge for glassy winged sharpshooter, a vector for Pierce's disease of grapes (California Agriculture 1997). Control of refugial vegetation has been suggested as a means of controlling the disease. Private or state efforts that eradicated elderberry shrubs could have serious adverse effects on the valley elderberry longhorn beetle.

Fertilizer, water quality, and contaminant effects were discussed above. Similar effects but greater in areal extent and magnitude occur outside and unrelated to project water deliveries.

Water diversions not under federal control cumulatively affect riparian species in the action area. Private and state diversions reduce streamflow and groundwater levels in riparian habitats in the area, with negative effects on listed species that use riparian zones.

Illegal and unreported destruction of their habitat poses a significant threat to many of the listed species in this consultation throughout much of their ranges. Discussion and examples were provided in the subsection above titled "Habitat conversions not addressed in the Project Description." A substantial portion of such conversions are unrelated to the proposed action and will not be reported for section 7 consultation, so these effects are cumulative to the proposed action.

Additional discussion of cumulative effects encompassing the contract service areas was provided in the November 21, 2000, programmatic long-term contracts biological opinion.

5. Conclusion

After reviewing the current status of the species considered in this biological opinion; the environmental baseline; the effects of the proposed renewal of the Buchanan and Hidden Unit water service contracts; the effects of the conservation measures; and the cumulative effects, the Service has concluded that the proposed action, as described in this opinion, is not likely to jeopardize the following species: Aleutian Canada goose, bald eagle, blunt-nosed leopard lizard, California red-legged frog, California tiger salamander, Colusa grass, Conservancy fairy shrimp, Delta smelt, fleshy owl's-clover, Fresno kangaroo rat, giant garter snake, Greene's tuctoria, hairy Orcutt grass, Hartweg's golden sunburst, mountain plover, palmate-bracted bird's-beak, Sacramento splittail, San Joaquin kit fox, San Joaquin Valley Orcutt grass, valley elderberry longhorn beetle, vernal pool fairy shrimp, and vernal pool tadpole shrimp, or destruction or adverse modification of critical habitat of delta smelt, Fresno kangaroo rat, or valley elderberry longhorn beetle. The Service has concluded that the proposed action, described in this opinion, is not likely to adversely affect the bald eagle.

It was also concluded that, because of their close proximity, historic range and inclusion in future consultation actions, the riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*) should continue to be a focus of conservation efforts for this Proposed Action, if conservation efforts in this Project Description are determined to be expandable to encompass the needs of these species. The SJV Recovery Plan for Upland Species identifies efforts to restore and link riparian habitat, and reintroduce populations of riparian woodrats and brush rabbits as conservation actions needed to recover these species. Effects to these species are germane to the Hidden and Buchanan water contracts and will be analyzed in future tiered consultations, including but not limited to Surplus Flood Flows Contracts and Implementation of the San Joaquin River Riparian Restoration Program.

This conclusion is based on the assumption that measures in this biological opinion are fully implemented. Actions that are not included in, and consistent with, the project description in this document have not been analyzed for their impacts on the survival and recovery of proposed and listed species.

6. Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of ESA do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that ESA requires a Federal permit for removal or reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State law, including the California Endangered Species Act, or in the course of any violation of a State criminal trespass law.

For this biological opinion, no incidental take is authorized. As discussed in the Introduction of this opinion, the following actions, included in the long-term renewal contracts, are not covered by this opinion. These actions, as listed below, and any other action not described in the Project Description of this biological opinion, will require separate determinations regarding their potential effects on threatened and endangered species and critical habitat pursuant to section 7 and/or section 10 of the ESA.

- Any future assignments of Central Valley Project water involving Friant or Cross Valley Division contractors, including Buchanan or Hidden contractors.
- Transfers and/or exchanges involving Buchanan or Hidden contractors
- Inclusions and exclusions to Hidden or Buchanan contract service area boundaries
- Warren Act contracts
- Surplus Flood Flow Water Contracts
- Future changes in purpose of use from Ag only to Ag/M&I involving Buchanan and Hidden contractors
- Any changes in purpose of use
- Operation and Maintenance on Eastman Lake and Hensley used to convey CVP water and implementation of the agreements to transfer the operations, maintenance, and

replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).

- Operation and Maintenance Plans
- Actions associated with the San Joaquin River Restoration Program
- New contracts
- Future contract renewals beyond the year 2026

Reporting Requirements

Reclamation shall notify the Service immediately if dead or injured endangered species are found during implementation of actions or on Reclamation land and must submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the individual(s) found. If endangered animals are captured, the report shall also include photographs of the individuals, condition of the individual, length of time held, release location, and any other pertinent information.

Reclamation shall meet with the Service's Sacramento Fish and Wildlife Office, Endangered Species Division (ESD) on a quarterly basis, or more frequently as needed, and provide **quarterly** reports to ESD to report on the progress of all commitments identified in the Project Description and terms and conditions contained in this biological opinion and other biological opinions that address service area effects of the CVP. Reclamation will provide the quarterly reports to ESD in draft format to allow Service review so that changes can be made prior to the final report transmittal to ESD. **The first quarterly status report will be due by March 30, 2001.**

In order to ensure that water deliveries do not exceed historical patterns and amounts as described in the project description, Reclamation shall report the amounts of water delivered each year and the proportion of deliveries relative to historic use. The reports shall also include the names and description of all actions affected by delivery of CVP water as of January 1, 1991, which Reclamation has determined to have no effect on listed species, including the number of acres affected, and the land use preceding and subsequent to the action. In addition, Reclamation shall also include plans to compensate habitat losses that did not likely adversely affect listed species, but for which the Service and Reclamation agreed that compensation habitat would be provided through management or acquisition in perpetuity. Reclamation shall transmit their plan for implementation of proposed compensation actions in these reports.

Reclamation shall require the districts to report immediately any information about take or suspected take of listed wildlife species. Reclamation shall immediately notify the Service within 24 hours of receiving such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. The Service contact person is Assistant Field Supervisor for Endangered Species Program, at (916) 414-6600. Any injured or killed specimens shall be deposited with the Service's Division of Law

Enforcement at either 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660; or 197 North Sunnyside Ave., Suite 104, Clovis, California, 93611, (209) 487-5773.

Upon locating a dead, injured, or sick endangered or threatened species specimen, initial notification must be made to the nearest Service Law Enforcement Office (Mr. Scott Pearson, 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660). Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

The U.S. Fish and Wildlife Service Regional Office in Portland, Oregon, must be notified by Reclamation immediately if any dead or sick listed wildlife species is found in or adjacent to pesticide-treated areas. Cause of death or illness, if known, also should be conveyed to this office. The appropriate contact is Richard Hill at (503) 231-6241.

The Service has provided a protocol for the handling of dead, injured, or ill listed species for pesticide analysis. When Reclamation suspects a species has been taken in violation of label restrictions, the incident(s) shall be reported to the U.S. Fish and Wildlife Service, Division of Law Enforcement or their designee in the Region in which the species is found. Instructions for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement (Mr. Scott Pearson, 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660).

7. Conservation Recommendations

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the ESA, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. The recommendations here relate only to the proposed action and do not necessarily represent complete fulfillment of Reclamations 7(a)(1) responsibilities. The Service recommends that Reclamation:

a. Implement all programs within CVPIA to be consistent with §7(a)(1) of the ESA.

b. Operate the CVP in a manner that is consistent with §7(a)(1) of the ESA.

c. When coordinating with the Service regarding project impacts and effects determinations, include coordination with the Service's Endangered Species Division to assure consistency with §2 and §4 of the ESA.

d. Provide annual assessments to the Service confirming whether or not the Assumptions included in this Project Description are valid.

e. In preparing NEPA documents relative to transferring or delivering water out of the CVP, or contributing selenium to the CVP, fully consider §7(d) of the ESA.

f. Fully implement §3406 of CVPIA prior to delivering or transferring water out of CVP service areas or out of the CVP place-of-use.

g. Conduct studies for the Central Valley Project with particular reference toward releasing more water to restore riparian habitat and contribute to the recovery of the riparian brush rabbit, riparian woodrat, and valley elderberry long horn beetle. The Service will assist in the study design.

h. Subsequent fulfillment of the Comprehensive Plan requirements under section 3406(c)(1) of the CVPIA, release more water, as needed, from Friant Dam to improve downstream water quality and to the extent necessary to restore high-value habitat for listed species.

i. Follow the strategy set forth by the Service's Habitat Conservation Division on implementation of 3406(b)(3) and 3408(j).

j. Provide more education to Reclamation staff at all levels on upholding the ESA and 7(a)(1) responsibilities.

k. Conduct workshops for Service and Reclamation staff on implementing this biological opinion and on the importance of the concepts of communication, coordination and cooperation that establish the premise of this biological opinion.

l. Provide outreach to the public and to schools on protecting listed species, establishing safe harbors, forming partnerships that foster conservation, and habitat conservation planning.

m. Fund studies of groundwater percolation and contaminant levels through the Service or the United States Geological Survey.

n. Follow ecosystem protection components for the Central Valley and Bay Delta of the Service's Ecoregion Program.

o. Adopt the Plan of Action prepared by the Service's Habitat Conservation Division and utilize the Request for Consultation Services for implementation of 3406(c)(1).

p. Evaluate species of concern and their associated habitats to assess possible adverse effects of CVP actions and identify conservation measures that could protect species populations and help avoid the necessity of listing those species under the ESA.

q. Establish a tracking program for compliance with this opinion and report to the Service any actions which are not consistent with this opinion.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

8. Reinitiation/Closing Statement

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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